MARCH 1950 — FIFTY-SIXTH YEAR

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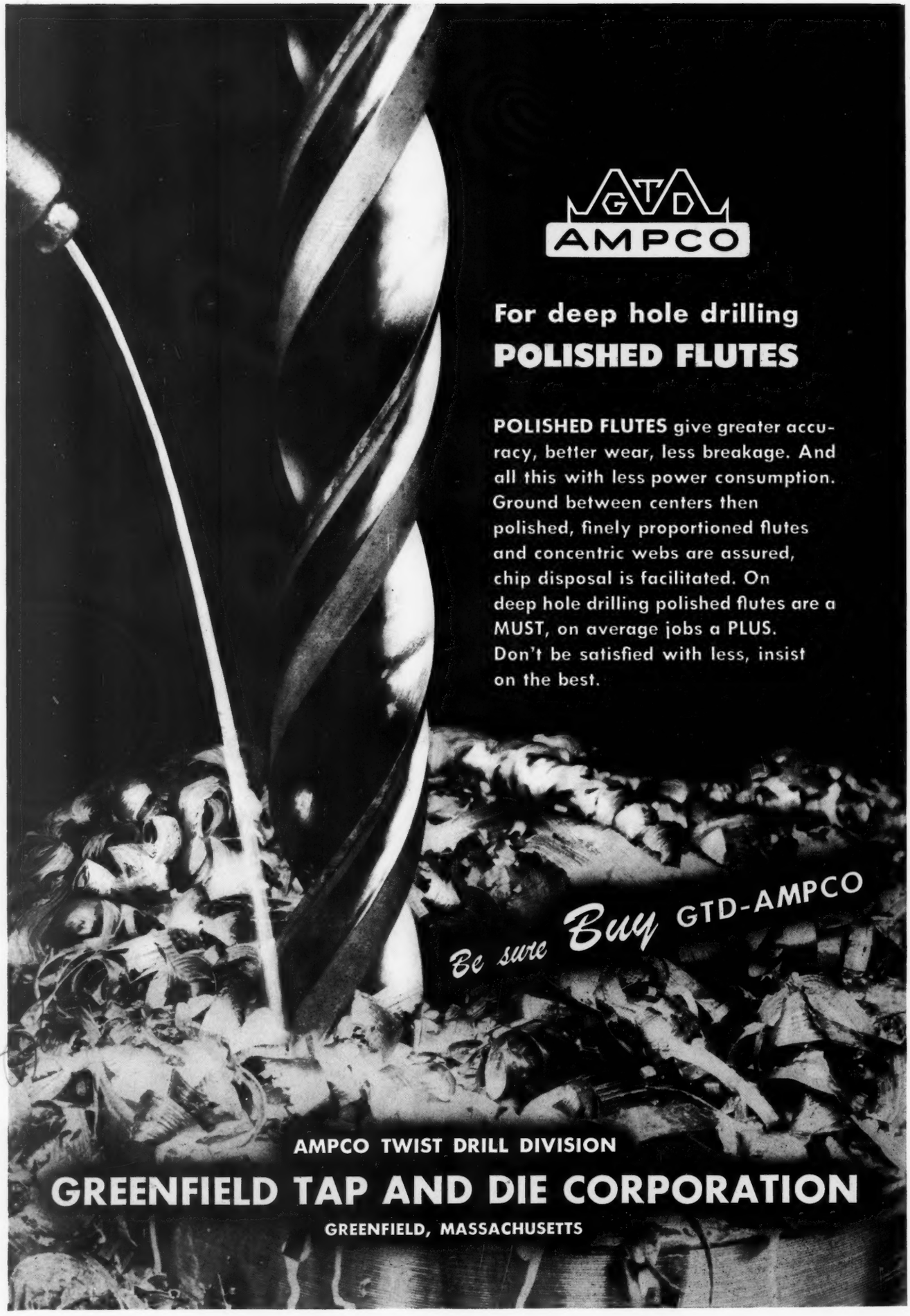
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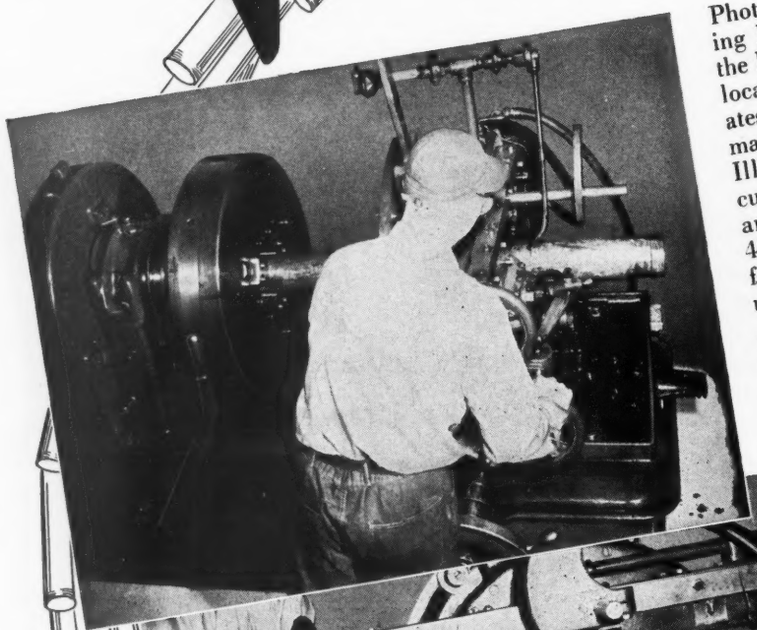
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Versatility





Photographs show a Landis Pipe Threading Machine installation in a Job Shop of the New York Central Railroad. This shop, located at Weehawken, New Jersey, operates as a Marine Repair Shop handling maintenance for tugs, barges, lighters, etc. Illustrations show wrought iron pipe being cut off after reaming and threading. Standard pipe threads are cut 1½" long on the 4" pipe, using a cutting speed of 25 surface feet per minute. This machine is also used for cutting boiler tubes to length.

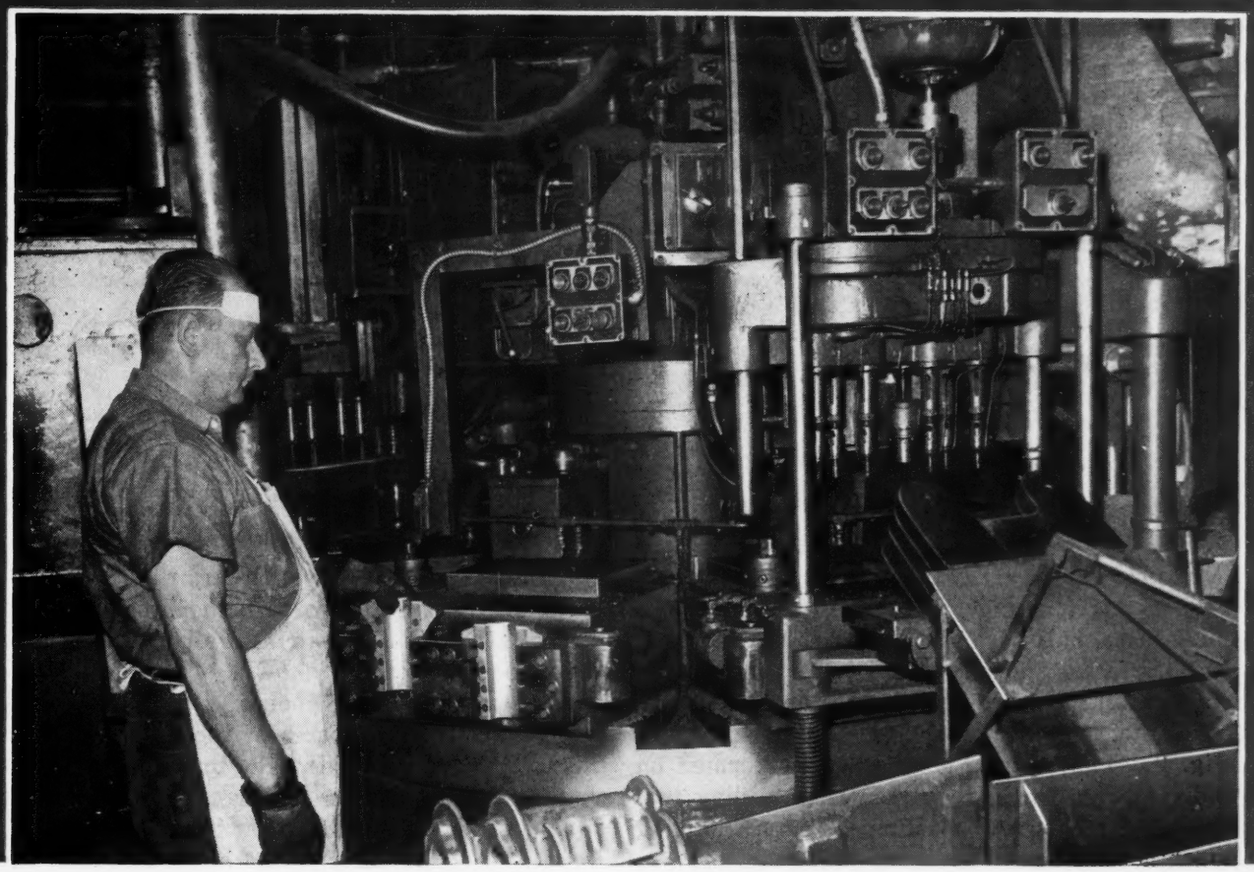
The wide diametrical range of the die heads and the use of patented tangential pipe chasers gives these machines a versatility invaluable in maintenance work. For example, the 6" Landis Pipe Threading Machine illustrated will thread all pipe sizes from 1" to 6", inclusive. Adjustment of the die head from one size to another is simple and quick. Chasers need not be changed except for threads of a different pitch, form, or taper. Chasers are interchangeable and need only be replaced singly as needed. Tangential cutting action reduces wear, and chasers can be reground to use over 80% of their length. Thus, these machines feature—wide capacity; minimum set-up; longer running time; low tool cost, replacement, and inventory—important cost saving features for maintenance shops. For specifications and further information, write for Bulletin C-61.

LANDIS

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MACHINERY

Vol. 56 MARCH, 1950 No. 7



Multiple Casting Speeds Output of Bearing Caps

By CHARLES H. WICK

Time Required for Handling, Loading, Machining, and Unloading has been Considerably Reduced by Combining Four of the Dodge and Plymouth Main Bearing Caps in One Casting. Caps are Now Completely Finished on Five Machines, Compared with the Twenty-Four Previously Required

BOTH the production and accuracy of crankshaft main-bearing caps have been increased at the Dodge and Plymouth Divisions of the Chrysler Corporation by combining the four caps in one casting. The composite gray iron castings, seen at *A* in Fig. 1, require less handling and are more easily located and clamped for the various machining operations. Individual caps are not sawed from the castings until the various machining operations have been practically completed.

Previously, with individually cast caps, as many as twenty-four machines were required. Now, the composite castings are broached, drilled, reamed, spot-faced, chamfered, milled, and tapped on five machines. It has been estimated that the expenditure for these new machines can be amortized in less than a year.

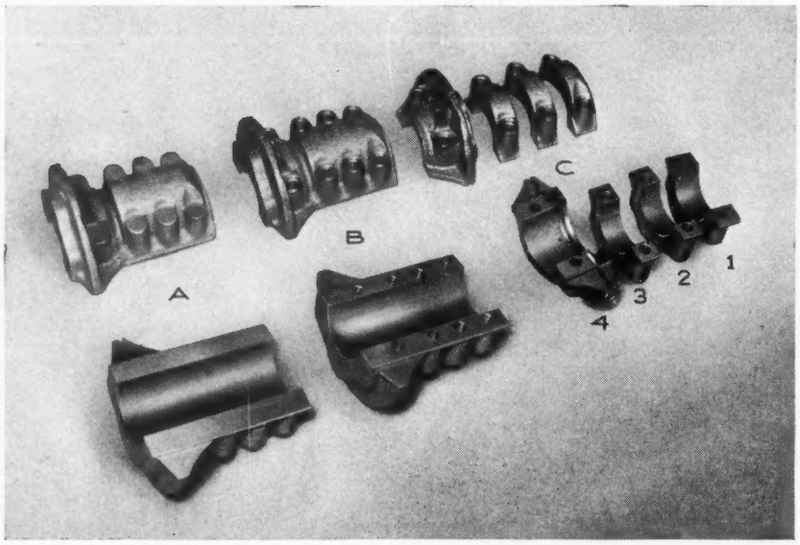


Fig. 1. Four crankshaft main-bearing caps are cast in one piece, as seen at (A) and (B). Completed caps are shown at (C)

The composite gray iron castings are shot-blasted and inspected prior to broaching. The joint faces, half-bore or bearing radius, bearing lock surfaces, and wings on the No. 4 bearing cap are all broached in one pass on the 25-ton, horizontal two-way broaching machine shown in Fig. 2. These operations, when performed on individual castings, required three milling machines, three boring machines, and a grinding machine. A broached casting is seen at *A* in Fig. 1.

Two sets of broaches, upper and lower, and two stations are provided on the double-acting, hydraulic machine, so that a broached casting can be unloaded and a rough casting loaded while another is being broached. A hydraulically actuated fixture at each station, Fig. 3, clamps the casting from both sides and ends. The fixtures automatically swivel through an angle of 90 degrees to present the work to the broaches, and at the end of the 84-inch ram stroke, return to the unloading position shown.

Approximately 1/16 inch of stock is removed from the various surfaces of the casting in one pass. The ram, carrying the broaches past the work, travels 120 inches per minute, giving a production of 150 castings per hour. About 0.010 inch of stock is allowed on the joint faces for removal in a finish-broaching operation after the caps are sawed apart. The width of the bearing lock surfaces is maintained within $\pm$ 0.001 inch.

On the trunnion type, double-end drilling machine illustrated in Fig. 4, all eight bolt-holes in the casting are drilled, spot-faced, chamfered, and reamed, and three oil-holes are drilled. This horizontal, two-way machine is equipped with a

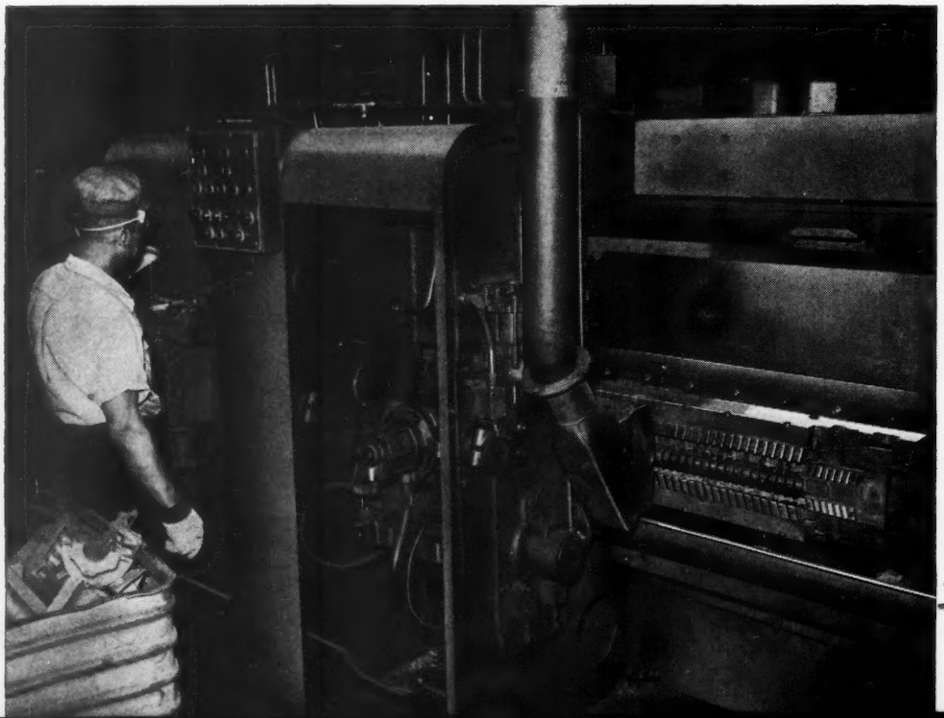


Fig. 2. A production of 150 multiple bearing-cap castings per hour is obtained on the 25-ton, two-way horizontal broaching machine illustrated

fifty-eight-spindle left-hand head, a twenty-four-spindle right-hand head, two angular drilling heads, and a six-station, drum type indexing fixture. The left- and right-hand heads are hydraulically fed, the angular heads are rack fed, and the rotary indexing fixture is power driven. With this equipment, a production of 112 castings per hour is obtained.

Each station of the rotary indexing drum is provided with two work-holding fixtures. At the first station, two finished castings are unloaded and two broached castings are loaded. The castings are located from the broached joint faces and bearing lock surfaces, and clamped manually by means of swing type levers and bolts. When the parts have been indexed to the second station, the eight bolt-holes in each casting are drilled half way to a diameter of 1/2 inch by 1/2 inch deep, four holes in each part being drilled by the left-hand head and four by the right-hand.

At the third station, four of the eight bolt-holes in each casting are drilled through by eight drills on the left-hand head, and the other four holes are spot-faced and chamfered by tools on the right-hand head. Similar operations performed at the fourth station complete the drilling, spot-facing, and chamfering of all eight bolt-holes. Also, a 3/16-inch diameter oil-hole is drilled to a depth of 7/8 inch in the half-bore of each casting.

The joint-face ends of the bolt-holes are chamfered at the fifth station, and another oil-hole, 7/16 inch in diameter by 1 5/32 inches deep, is drilled in each casting at an angle of 29 degrees. Reamers located on the left-hand head at the sixth station increase the diameters of the bolt-holes from 1/2 to 17/32 inch. The third angular oil-hole is also drilled at this final machining station. All of the tools are rotated at 80 surface feet per minute. Drills are fed at the rate of 6 inches per minute, and reamers at 4 inches per minute. A completed part is seen at *B* in Fig. 1. Six machines were formerly required to perform the operations now completed on this one machine.

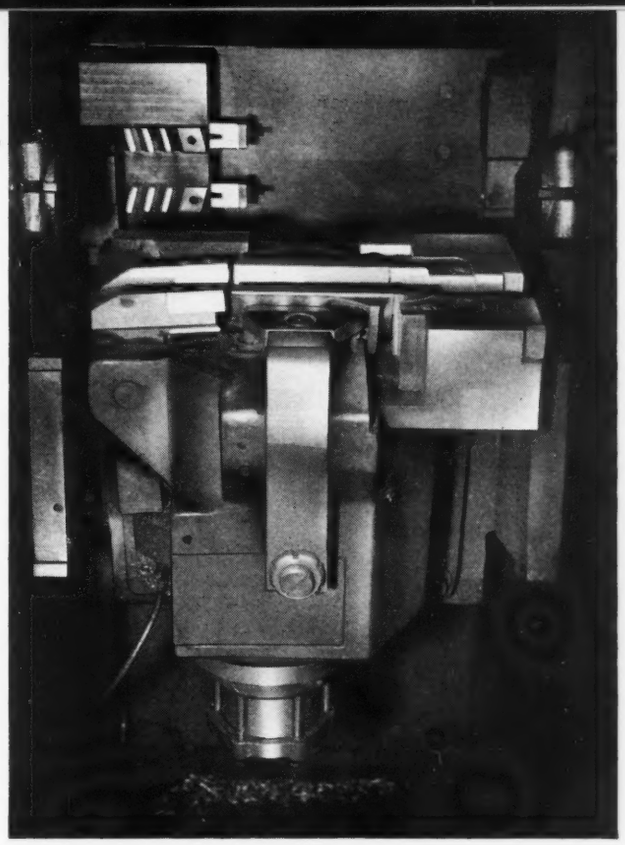


Fig. 3. Close-up view of the hydraulically actuated tilting fixture employed on the broaching machine shown in Fig. 2. The casting is clamped from both sides and ends

Individual bearing caps are sawed from the

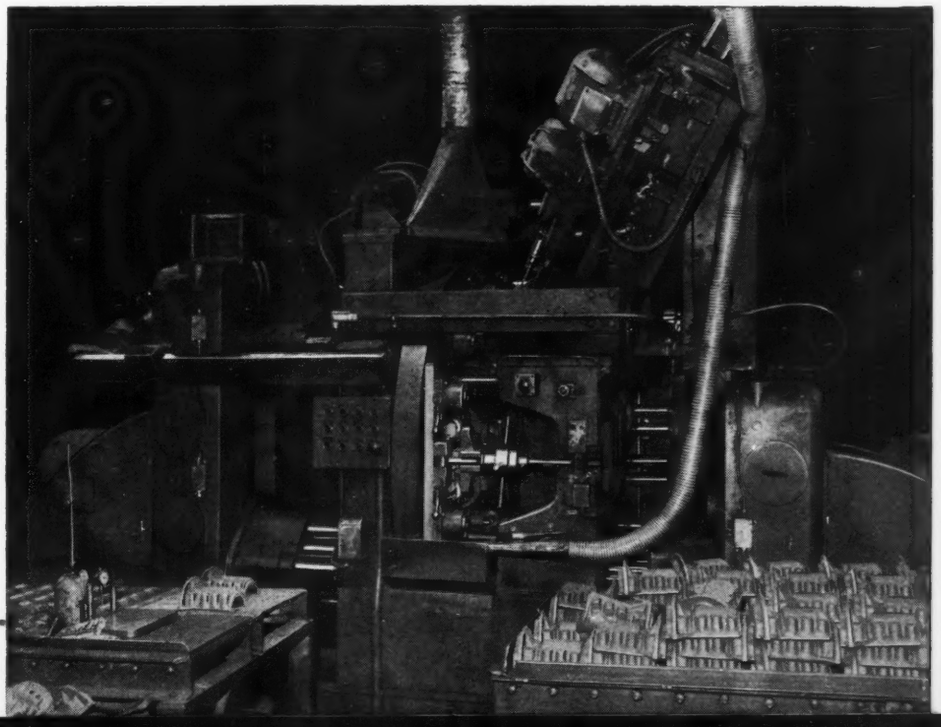


Fig. 4. Eight bolt-holes in each casting are drilled, faced, chamfered, and reamed, and three oil-holes are drilled on this six-station machine

castings on the eight-station combination milling, drilling, and tapping machine shown in the heading illustration. This machine contains five horizontal milling units, two vertical drilling heads, a vertical tapping unit, and an eight-station, power-driven indexing table.

The hydraulically actuated fixture at each station holds two castings, the parts being located from the bearing lock surfaces. Shot-pins enter the reamed bolt-holes. Each of the horizontal hydraulically fed milling units is provided with two vertical arbors on which are mounted a complete set of cutters. The cutters on each arbor are rotated in opposite directions to equalize the pressure exerted on the work and fixture.

Castings are loaded into the fixture at the first station, seen at the left in the heading illustration, after which they are indexed to the second station, where the ends are face-milled to length, leaving 0.031 inch of stock on each end for removal at assembly. Two carbide-tipped side milling cutters, 6 inches in diameter by 3/4 inch wide, are mounted on each arbor for this face-milling operation. While this operation is being performed, an oil-slinger groove is rough-formed by a plain carbide-tipped milling cutter, 3 3/4 inches in diameter by 3/8 inch wide, also mounted on each of these arbors.

At the third station, an oil gasket recess, 0.070 inch wide by 41/64 inch deep, is cut across the joint faces of the No. 4 caps by a carbide-tipped shell end-mill, 2 1/2 inches in diameter by 1 5/8 inches long, mounted on the end of each spindle on the double-spindle, horizontal milling unit. A vertical head at this station is employed to drill three holes, 0.196 inch in diameter by 25/32 inch deep, in the side of the No. 4 cap on each casting.

Bearing insert locking slots, which are 3/16 inch wide in the Nos. 1, 2, and 3 caps and 1/4 inch wide in the No. 4 cap, are cut by means of four plain milling cutters, 2 3/4 inches in diameter, mounted on each arbor at the fourth station. The No. 1 bearing cap, shown at *C* in Fig. 1, is sawed from the bottom of each casting by a carbide-tipped milling cutter, 6 inches in diameter by 5/16 inch wide, also mounted on each arbor at this station. Slots, 0.190 inch wide, are milled in each part at the fifth station.

The three main bearing caps (Nos. 2, 3, and 4) remaining on the castings are separated at the sixth station by two slotting cutters keyed to each milling arbor. The slotting cutters, 5 inches in diameter by 5/16 inch wide, have carbide-tipped, staggered teeth, so designed that only one tooth enters the cut at a time. The Nos. 2 and 3 caps are of the desired width, the No. 4 cap has a 1/32-inch stock allowance on both sides, and the No. 1 cap (cut off in the previous station) has a 1/32-inch allowance on one side.

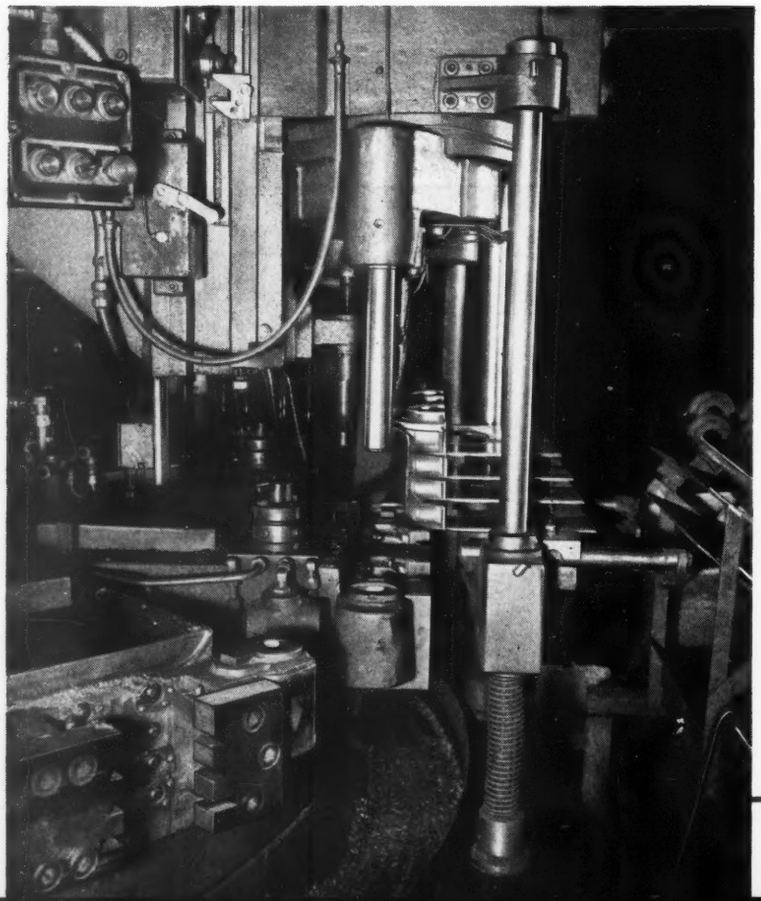


Fig. 5. Close-up view of the final machining station on the eight-station special machine seen in the heading illustration. An automatic ejector at the right of the machine unloads the caps

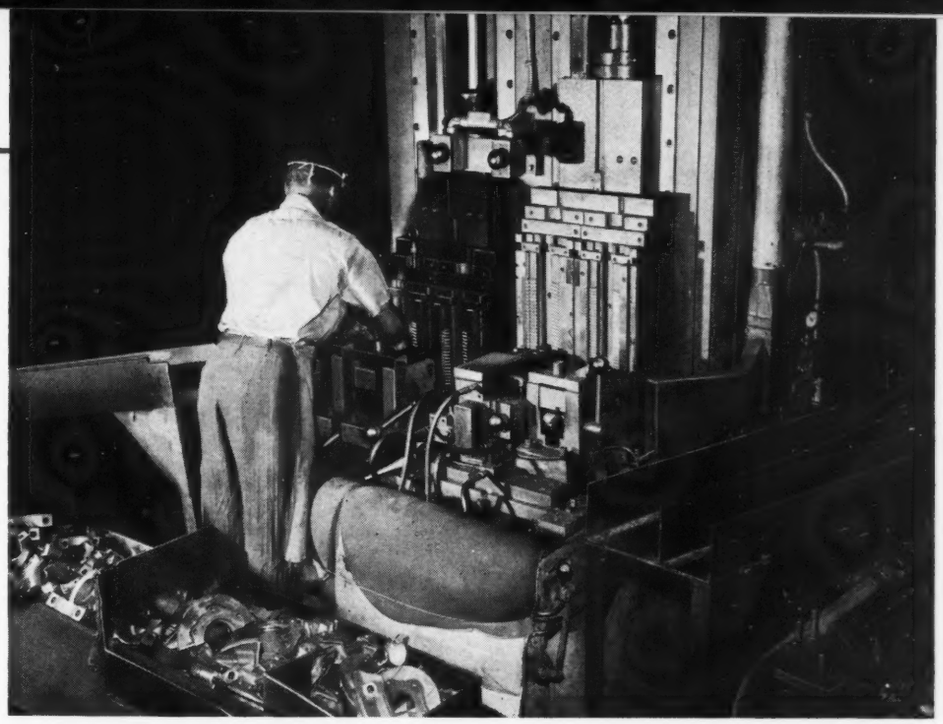


Fig. 6. Joint faces and bearing lock surfaces are finish-broached on a 5-ton, dual-ram vertical machine

Oil-slinger grooves in the No. 4 caps are semi-finish-milled at this station by convex cutters, 4 inches in diameter by 1/4 inch wide. Also, the half-bore at one end of the No. 4 cap is relieved by a milling cutter 2.946 inches in diameter by 0.359 inch wide.

The three holes drilled in the side of the No. 4 cap at the third station are chamfered at the seventh station and threaded by 1/4-inch taps having twenty threads per inch at the eighth station. An automatic ejector, as seen in Fig. 5, is provided at this station to carry the individual caps to a conveyor. Four horizontal plates on the ejector automatically enter the slots in the fixture, lift the caps out of the fixture, carry them away from the machine (to the right in the illustration), and then tilt, causing the caps to slide onto a conveyor leading to the next machine.

All tools except the taps and drills are carbide-tipped and are rotated at 200 surface feet per minute. The surface speed of the taps and drills is 70 feet per minute. Tools are fed at the rate of 8 inches per minute, and a production of 180 castings (720 bearing caps) per hour is obtained.

A 5-ton, 42-inch stroke broaching machine, Fig. 6, is used to finish-broach the joint faces and bearing lock surfaces of all four main bearing caps. Two fixtures are provided on this dual-ram vertical machine, the Nos. 2 and 3 caps being held in the left-hand and the Nos. 1 and 4 in the right-hand fixture. One fixture is unloaded and reloaded while two caps in the other are being broached, resulting in a production of 750 sets of caps per eight-hour shift with only one operator. The bearing lock surfaces are broached to the required dowel width within a tolerance of ± 0.0005 inch.

The outside diameter of the flange on the No. 4 cap is then turned to form a 3 9/32-inch radius. Two of the caps are machined at a time in a 14-inch automatic lathe, the parts being held in a two-jaw air-operated chuck. A cam-fed circular form tool is mounted on the front carriage for roughing, and a similar tool at the rear of the lathe for finishing. With a work speed of 70 R.P.M. and a feed of 0.013 inch per revolution, a pair of caps is completed every minute.

Following this operation, all the caps are loaded on an overhead conveyor, which carries them through an automatic washing machine. After inspection, the parts are loaded on another conveyor for delivery to the cylinder-block assembly department.

Hopper Selector Mechanisms

IN designing hoppers for feeding parts automatically into assembling machines, cases are often encountered where the work is required to enter the machine in a certain position for correct assembly with other components. To accomplish this, the hopper must be provided with a selector mechanism. Various mechanisms designed for this purpose are illustrated in this article.

In the example shown in Fig. 1, one end of the work-piece is turned down to a slightly smaller diameter than the remainder of the piece, and the part is required to be fed into the machine with the small end first. A part of this shape would ordinarily be handled by a centerboard hopper such as described in the article "Design of Hoppers for Automatic Machines" in December, 1949, MACHINERY, page 156. However, the centerboard blade may lift the part up in either of two positions, with the smaller end toward the machine or with the larger end facing in that direction.

To insure that the piece will enter the machine in the correct position, a selector mechanism designed as shown in the illustration may be employed. This mechanism is located at some point between the hopper and the machine. Parts fed from the hopper fall into the selector wheel of the device, which is designed so as to allow the pieces that have been picked up correctly in the hopper to pass through into the machine, while those that are in the wrong position are turned, end for end, before entering the machine.

Referring to the illustration, it will be seen that the selector mechanism consists of a housing *A*, a stationary center plug *B*, and an intermittently rotating ring *C*, driven by a ratchet wheel *J*. A circular groove *D* is machined in the center plug, which is slightly wider than the small diameter of the work-piece. A hardened pin *E* is pressed into the center plug, and a spring-actuated pin *F* is located two stations away as shown. Pin *F* and the flat spring *H* may be seen more clearly in section *X–X*.

In operation, the parts slide down a tube from the hopper and enter a groove machined in the rotating ring *C*, coming to a stop against the end of the hardened pin *E*. When the ring indexes, the parts are carried to the idle vertical station. As they leave the pin *E*, the small end

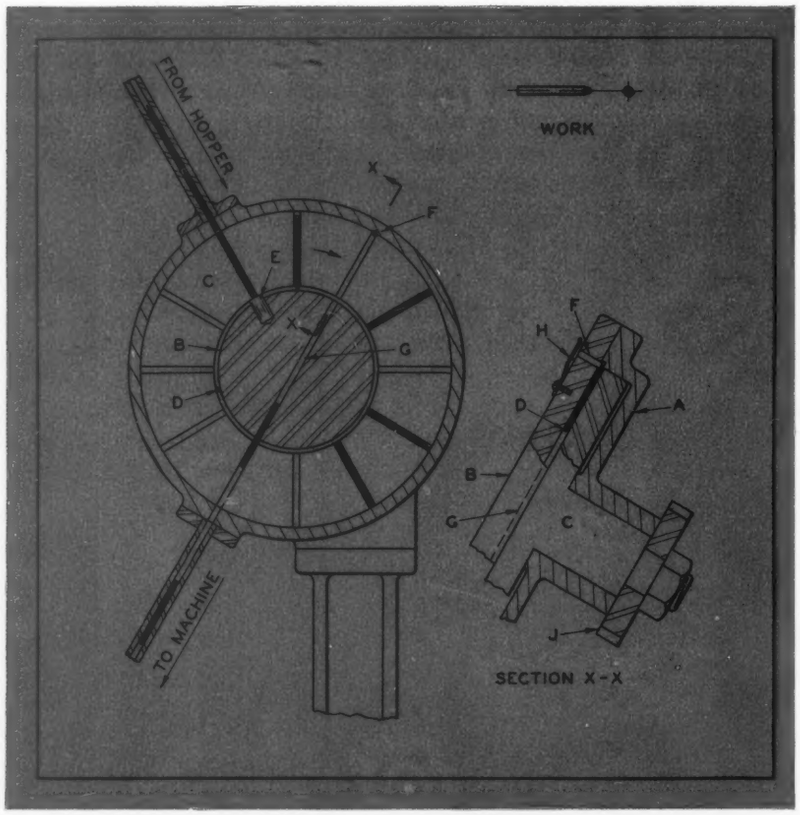


Fig. 1. Spring-actuated pin (F) in this selecting mechanism prevents work fed from a hopper in the incorrect position from being transferred to a machine. After the wheel has rotated to turn these pieces over, they are free to enter a tube leading to the machine

for Automatic Machines

By J. R. PAQUIN

of those pieces that are positioned correctly will enter groove *D*. Pin *F* at the next station will not touch the parts in the groove, due to their lowered position, and thus they will be free to enter a groove *G* machined in the center plug, through which they slide out of the selector and into a tube leading to the machine.

An incorrectly positioned part, having its small end toward the selector housing, cannot enter groove *D*. Hence, when it comes opposite groove *G* in the center plug, the spring-actuated pin *F* will bear on the end and hold it from sliding down the groove. As the wheel continues to index, the part is carried around, so that when it comes opposite the tube leading to the machine it will have been turned end for end, and thus enters the machine with the small end first, as required.

In laying out this type of selector wheel, the length of the tube between the selector and the machine must be great enough to hold at least six parts—preferably more. This would insure a sufficient supply of parts to the machine in case all the pieces for a certain period of time came from the hopper in the wrong position and had to be carried around by the wheel and turned before being fed to the machine.

This type of selecting device has been found successful for a wide variety of parts. Occasionally, a great deal of ingenuity is required to design the actual method of selecting, but once this is accomplished, hopper problems can be met that would otherwise be impossible to solve.

To handle a part formed as illustrated in Fig. 2, the rotating ring in the selector would have a circular blade *A* pressed into it as shown. The parts that are in the correct position as they come from the hopper rest on this blade, and when they are opposite the groove in the center plug, slide down toward the assembly machine. Those parts that are incorrectly positioned are held by the blade, as shown at section *X–X*. In this case, as in the previous example, the part is carried around to the bottom of the ring, where it is in the proper position to enter the machine. There it slides over the inclined face of the retaining blade and into the feed-tube.

A magnetic selecting device can be used for certain parts, as shown in Fig. 3. In this case, a permanent magnet *A* is employed at the selecting station for work having a pointed end, as seen in the illustration. The magnetic attraction is not great enough to hold the parts when the point is toward the magnet, and they slide through to the machine. However, when the flat end of the part is toward the magnet, it is held and carried around by the wheel so that it enters the tube leading to the machine in the desired position.

This is a cheap and efficient selecting device for certain types of parts. It is ideal for use in connection with pin-driving machines. In this case, the rotating ring must be made of some non-magnetic material, and so must the tube leading to the machine. Occasionally, it will be found necessary to provide a demagnetizing coil around the tube.

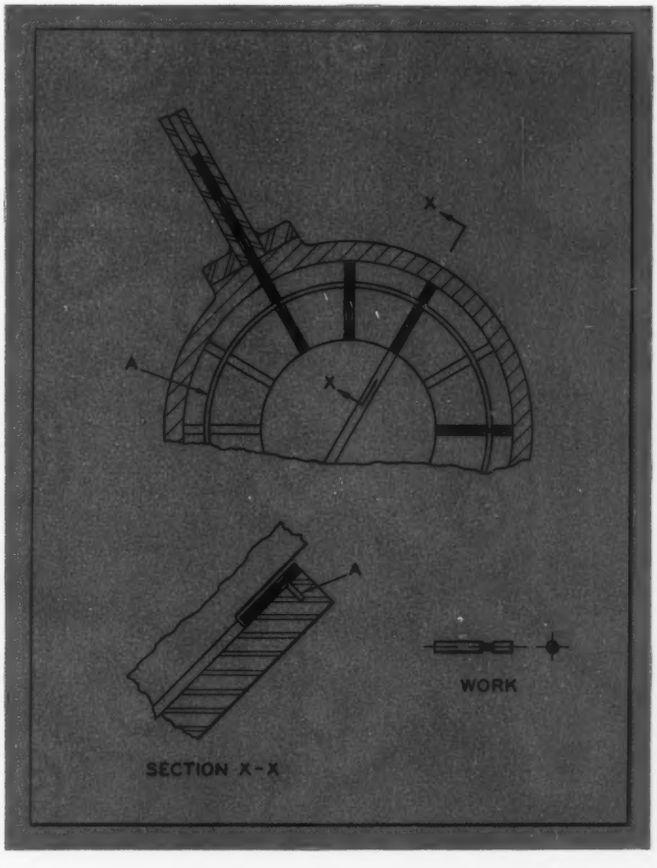


Fig. 2. Parts of the shape shown are uniformly positioned by a selector which has a circular blade (A) that holds incorrectly located parts until they are turned over by the rotation of the selector wheel

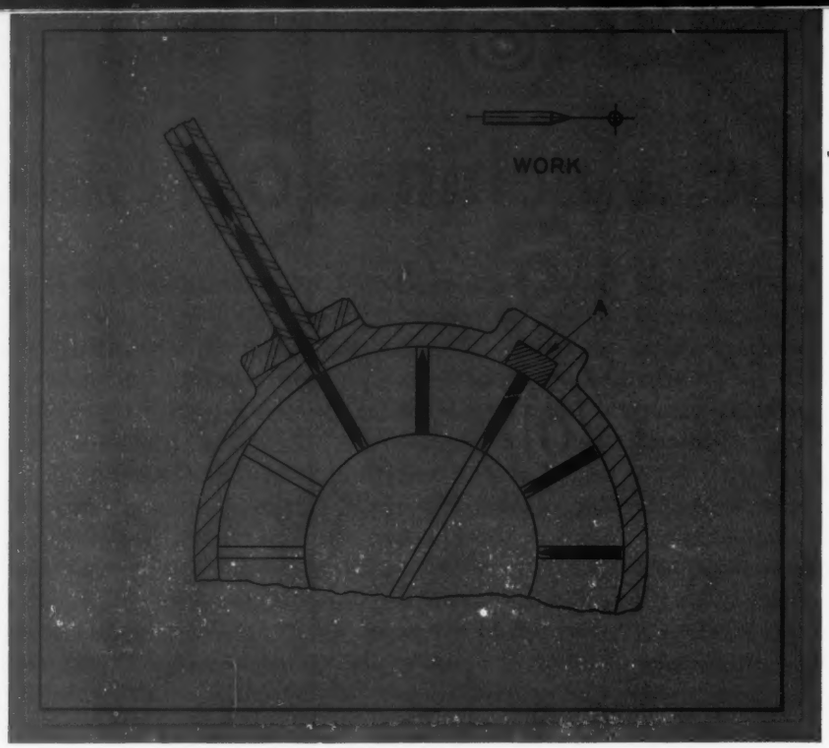


Fig. 3. A permanent magnet (A) is employed in this selector to prevent parts that are fed to it in the wrong position from being transferred to a machine

Fig. 4. Hook-shaped parts are held in this selector by means of a blade (A) that prevents them from dropping through to a machine when they are fed to the selector in the wrong position

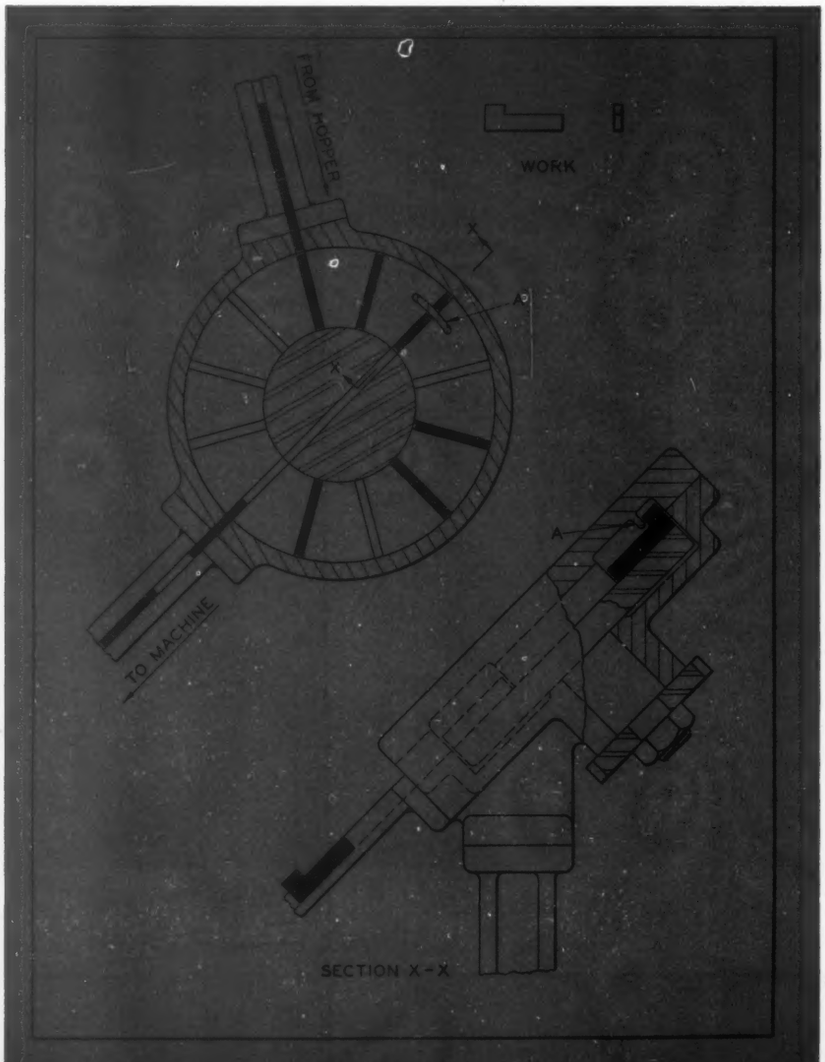


Fig. 4 illustrates a selector designed for flat, hook-shaped parts. A blade *A* in the cover engages the hook of incorrectly located parts and prevents them going through to the machine. When the parts are correctly positioned, the hook does not engage the blade, and the parts are free to go through. Section *X–X* shows the details of construction; it will be noted that the selector, in this case, is mounted at an angle rather than vertically. This is the most positive type of selector, and should be used whenever possible. Unfortunately, many parts do not lend themselves to such positive treatment, and spring pressure or magnetic properties must be resorted to.

Shallow drawn parts, such as covers for various units, can easily be handled by means of the vertically mounted selector wheel shown in Fig. 5. With this arrangement, the covers enter slots in the rotating ring, and those with the open side up slide through the groove to the machine. Incorrectly placed covers are held from going through by the plugs *A*, and are carried around by the ring, falling into the feed-track right side up. In this case, the rotating ring must be fabricated sectionally in order to permit assembly of the plugs *A*.

The simple device shown in Fig. 6 is used to position cans so that they will all be fed to a machine with their open ends up. In use, they slide down a tube from the hopper and hit a projecting pin *A*. Those that come down bottom first simply bounce from the

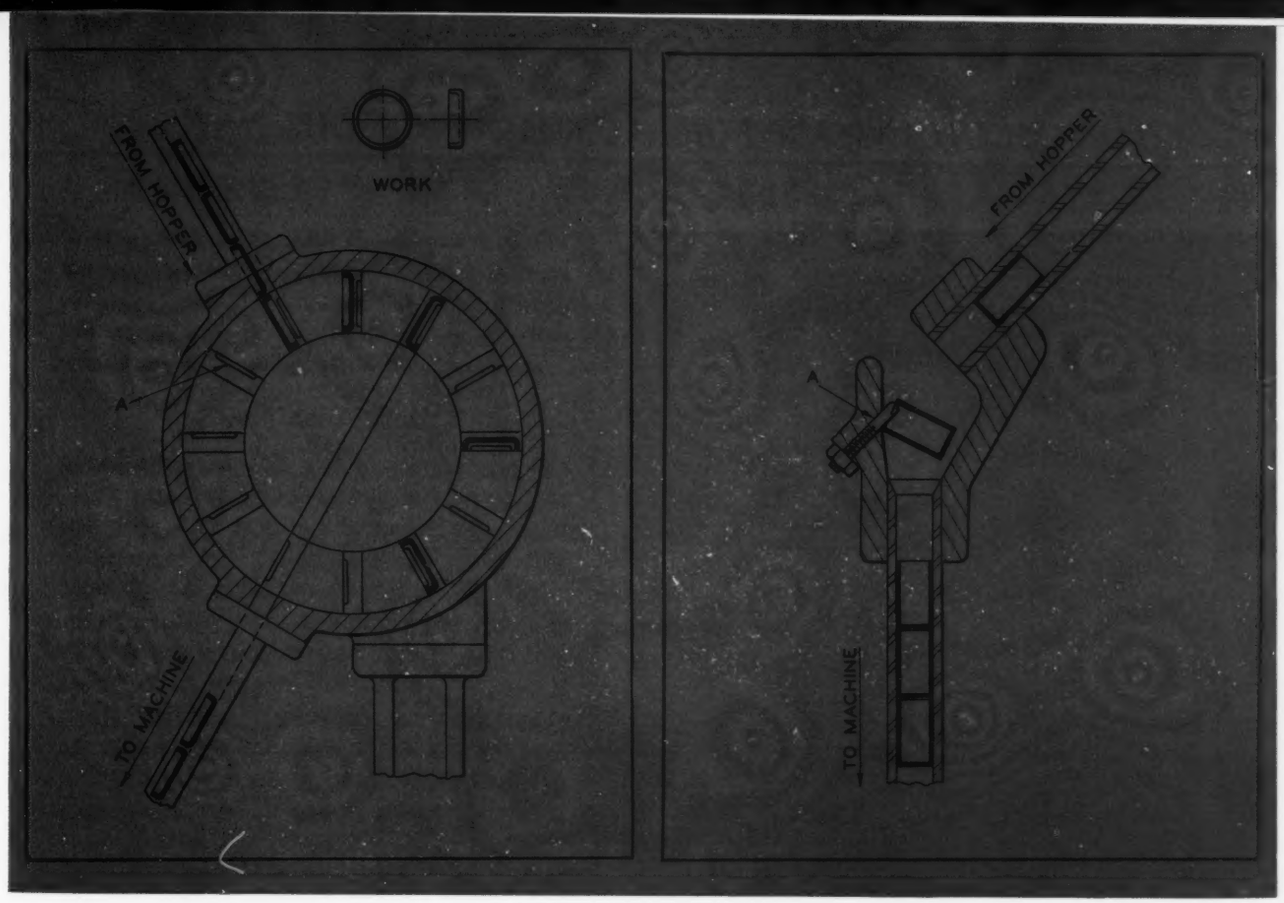


Fig. 5. Shallow drawn parts are properly directed to a machine by this selector, which holds incorrectly positioned parts by plugs (A) and prevents them from being fed to the machine

Fig. 6. Cups are turned over or passed through this selector so as to enter a track in a uniform position for feeding to a machine. Pin (A) reverses incorrectly positioned cups

Fig. 7. Where parts must enter a machine in the reverse position from that in which they are placed by the selector, the track arrangement illustrated can be employed

Fig. 8. Parts that have been uniformly directed to the machine in the wrong position because of selector design considerations can be reversed by a simple bend in a track



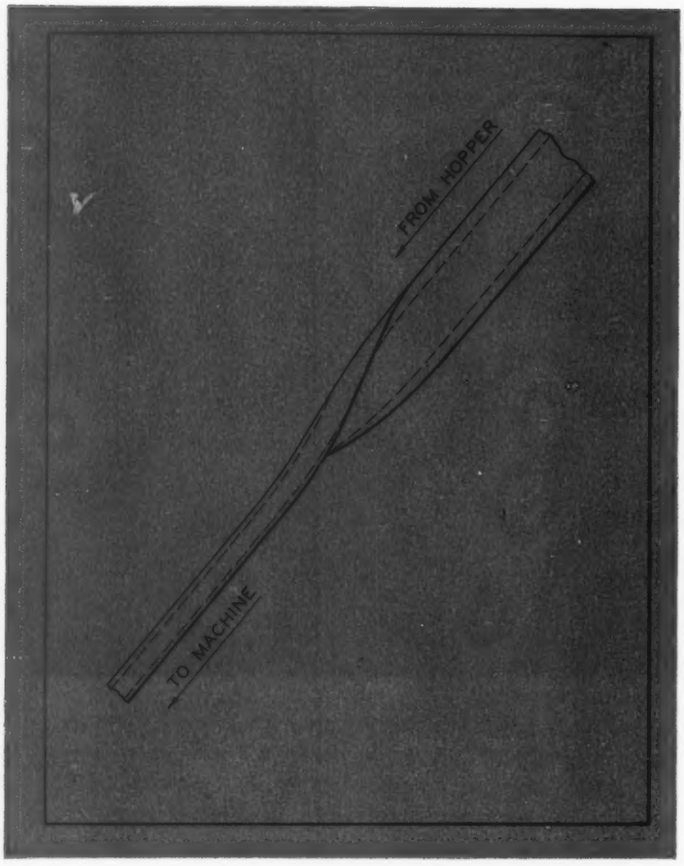


Fig. 9. Where parts must be picked up in a vertical position by the hopper, but are required to be fed into the machine horizontally, a quarter twist in the track to the machine will serve to turn them over

pin and fall down the vertical tube in the same relative position. The cans that come down open end first catch on the projecting pin and flop over, so that they fall down the tube toward the machine in the desired position.

It often happens that the easiest method of selection is to place the parts in the opposite position to that required by the sequence of operations in a particular machine. This was true in the case shown in Fig. 3, where the parts had to be fed to the machine point first, but were selected so that the opposite ends faced the machine.

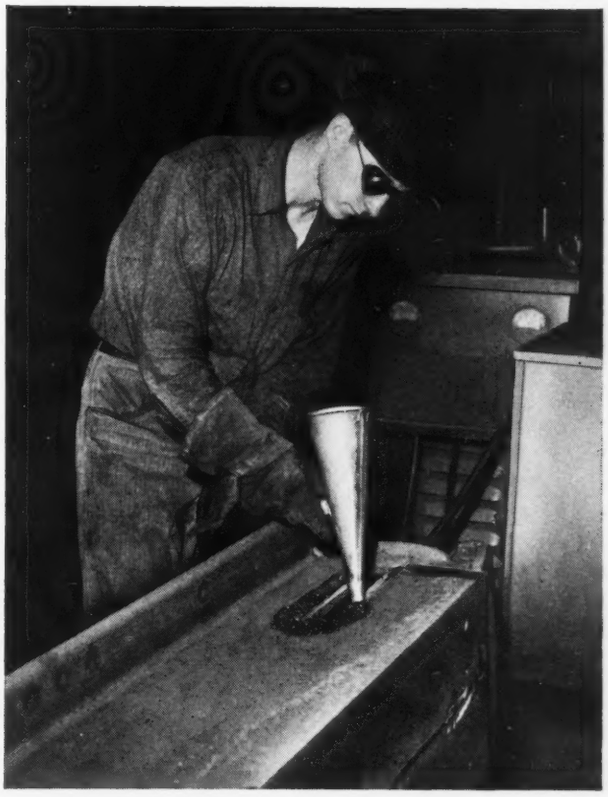
In such cases, the track arrangement shown in Fig. 7 can be used to turn them end for end. This consists of a track with a break in it, arranged as shown. Two side plates *A* prevent the parts from leaving the track. When they must be turned upside down, a simple bend in the track, as shown in Fig. 8, will accomplish this most effectively. It can be seen that in this case the cover *A* becomes the bottom of the track below the bend.

Fig. 9 shows a quarter twist applied to a track. This is useful where the parts must be picked up in a vertical position by the hopper, but must be fed into the machine horizontally. Occasionally, a half twist is applied to the track to turn the parts upside down, where space requirements do not permit the use of a bend such as shown in Fig. 8.

These examples by no means exhaust the possibilities of selecting mechanisms for automatic machines. However, they do show how hopper feeding difficulties have been successfully met, and they should serve as a sound basis for the solution of similar problems.

Hidden-Arc Welding Applied in Car Building

By G. R. JOHNSON
The Lincoln Electric Co.
Cleveland, Ohio



WELDED joints in railroad cars must be uniform, and, in addition, must possess high strength, ductility, shock resistance, and corrosion resistance. Welds of these qualities are accomplished at high production rates in car-building operations at the Berwick, Pa., shops of the American Car and Foundry Company by the use of the hidden-arc welding process.

In this shielded metal-arc process, called "Lincolnweld" by the Lincoln Electric Co., a granular flux is deposited on the joint to be welded, of sufficient depth to completely cover the end of a bare metallic electrode, shielding the arc during the welding operation. The entire welding action takes place beneath the blanket of flux without sparks, smoke, spatter, or flash, and the electrode is fed by power into the granulated material at an automatically controlled rate, depending on the required length of arc.

Direct current produces the arc between the electrode and the joint, the resulting heat fusing the electrode and the parent metal. The melted flux adjacent to the arc floats on the surface of the molten metal and solidifies to form slag on top of the weld. The amount of flux consumed as slag varies with the voltage used, but is approximately equal in weight to that of the electrode metal. The upper portion of the flux material remains unchanged in appearance and properties, and can be reclaimed for subsequent use.

The fact that the arc and the weld metal are completely shielded from the air by the blanket of flux insures the production of uniform, high quality welds. In addition, greater penetration



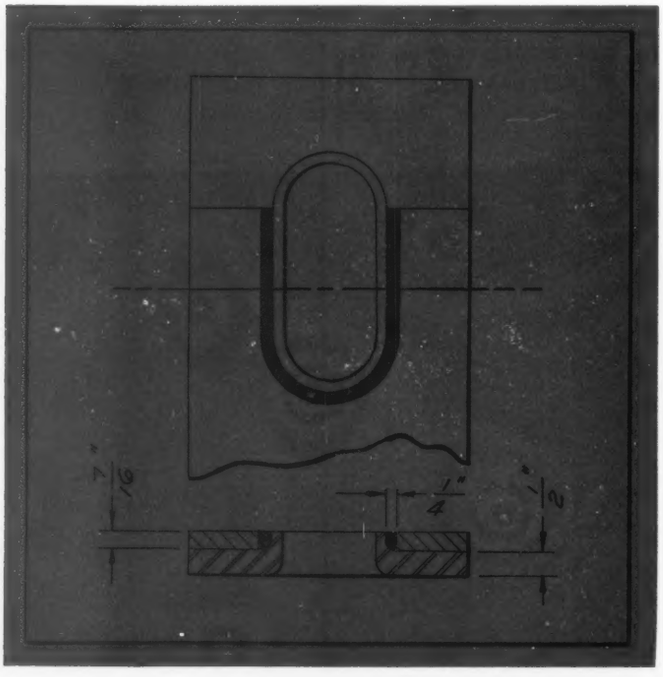
Fig. 1. Making a 1/4-inch fillet weld, 32 feet long, by the hidden-arc process in fabricating a bolster



Fig. 2. Steel plates, 1/2 inch thick, are joined by a 5/16-inch fillet weld to form parts of a car section

is secured because of the higher concentration of heat due to the insulating qualities of the flux. The flux blanket also, by confining the metal, controls the bead shape and allows the use of much higher current densities than can be employed with an open arc.

The design of the equipment provides for feeding electrode wire through the welding gun at high speeds, permitting the use of small-diameter wire at high melt-off rates. The resulting high current density for the small (5/64 inch diameter) electrode used concentrates high heats in a relatively small zone. The increased penetration and high welding speeds produce unusual economies and enable the process to be applied in cases where regular hand welding could not be used successfully.



An example of a semi-automatic application of the process is illustrated in Fig. 1. Here a 1/4-inch fillet weld is being made for a length of 32 feet in building a bolster. An arc speed, or rate of electrode travel, of 22 inches per minute is employed with a current of 325 amperes. Bare rod, 5/64 inch in diameter, is fed continuously at an automatically controlled rate of approximately 200 inches per minute. Considerably less time is required to join the 1/4-inch thick cross plates to the 3/8-inch thick side plates of the bolster than was needed when hand welding methods were used.

Another semi-automatic application may

Fig. 3. A 1/4-inch flush weld is used in joining the SAE 1020 steel sections shown in the heading illustration

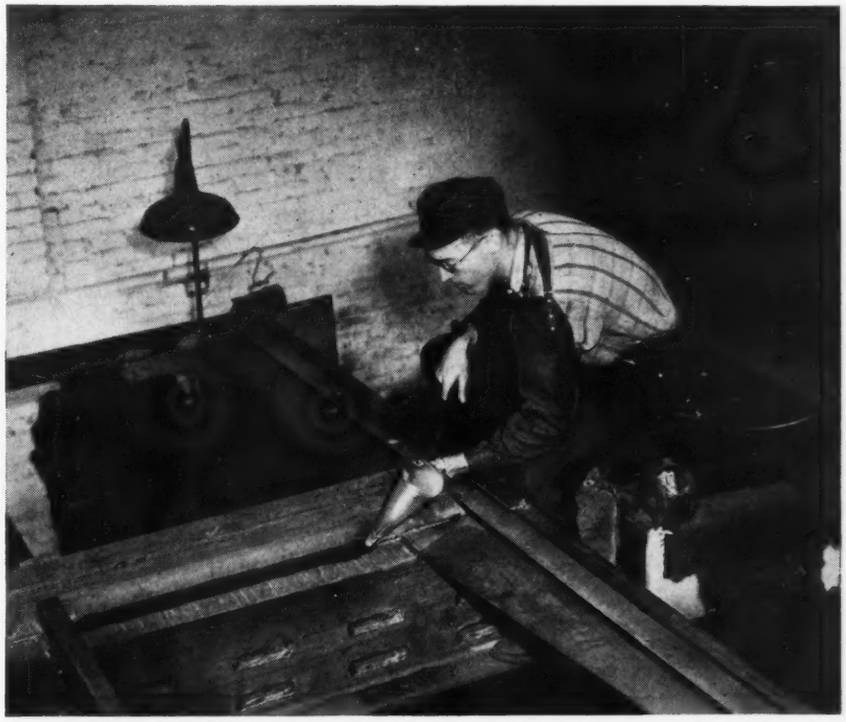


Fig. 4. Joining parts of car sections with a 5/16-inch fillet weld at an arc speed of 18 inches a minute

be seen in Fig. 2. Here steel plates, 1/2 inch thick, are being joined to form a center filler side and a rear draft lug on a car section. An arc speed of 18 inches per minute with a current of 425 amperes is used to produce 5/16-inch fillet welds. The electrode (5/64-inch diameter bare wire) is fed at the rate of 300 inches per minute.

The operation shown in the heading illustration consists of producing a 1/4-inch flush weld in joining a forged striker and a center sill. Fig. 3 is a diagram of this joint, which is produced at an approximate arc speed of 12 inches per minute with a current of 425 amperes. As in the operations previously described, a 5/64-inch diameter bare rod is used.

A 5/16-inch fillet weld is used to join a reinforcement to the center sill, as seen in Fig. 4. The steel sections are shown diagrammatically in Fig. 5. An arc speed of 18 inches per minute with a current of 400 amperes is employed for this operation.

It is interesting to note that, in this welding process, two volumes of parent metal are fused for each volume of filler rod added. Therefore, the weld metal takes on the properties of the base metal more nearly than it does when only small quantities of the base metal are fused with the rod. In the jobs described—all on SAE 1020 steel—the welds had a tensile strength of 60,000 to 70,000 pounds per square inch, with an elongation of 30 to 35 per cent in 2 inches.

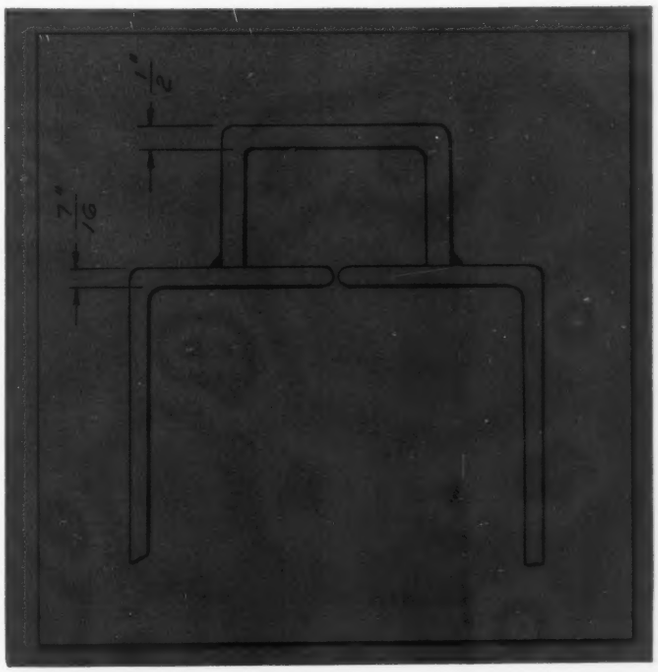
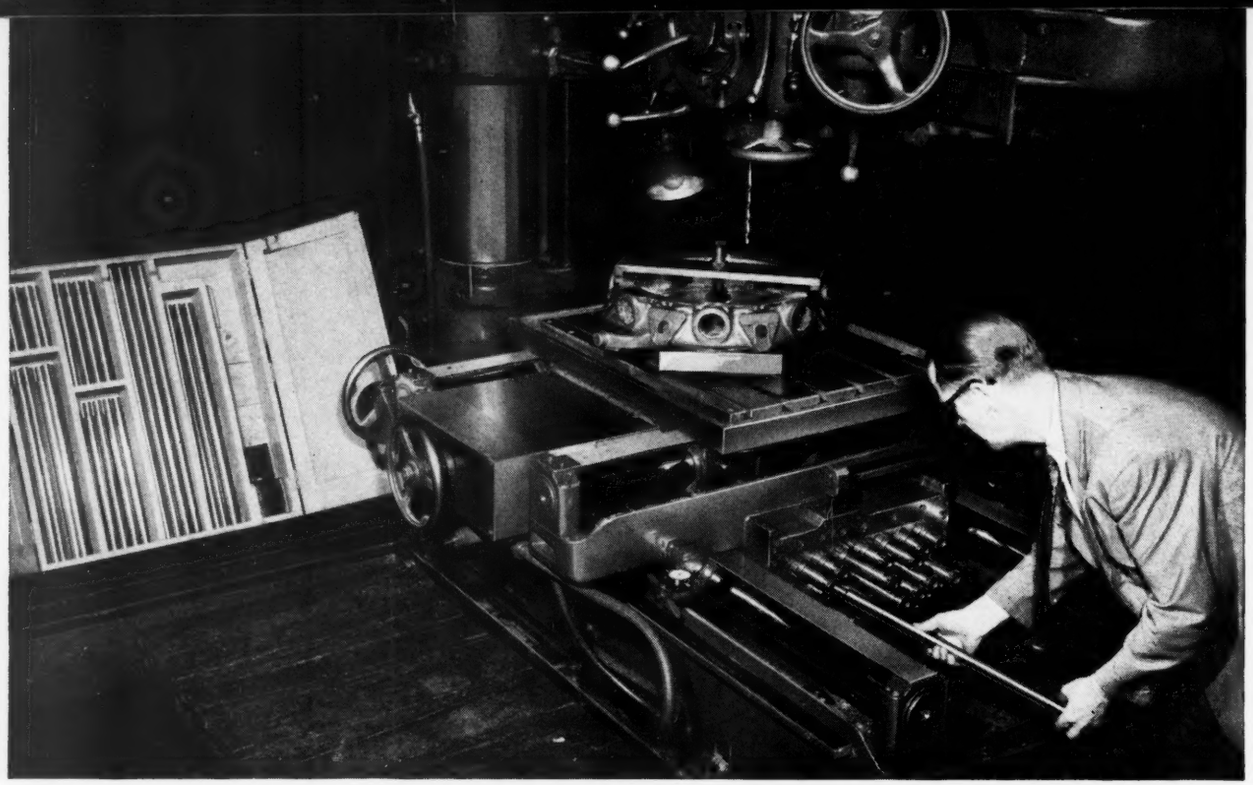


Fig. 5. Diagram of the joint illustrated in Fig. 4, showing relative thicknesses of welded SAE 1020 steel sections



Precision Drilling without Jigs and Fixtures

By GEORGE H. DeGROAT

EXPERIMENTAL aircraft engines made in small quantities require the same precise manufacturing methods as engines that are built on a mass-production basis. Ordinarily, jigs and fixtures are needed for the accurate location of holes in such engine parts as supercharger front and rear housings, rear covers, etc., many of which are made in small quantities, not only for development purposes, but also for use as spare or replacement parts.

Because of the high cost of designing and building special jigs for small quantity production, the Wright Aeronautical Corporation, Wood-Ridge, N. J., has installed equipment that enables the high degree of accuracy required in engine parts to be obtained without the use of jigs or fixtures.

A "Man-Au-Trol" spacer, developed by the Bullard Co., Bridgeport, Conn., is applied to a radial drilling machine, as shown in Fig. 1, for the rapid positioning of engine parts requiring accurately located holes. The work is clamped on a hydraulically operated semi-automatic work-table which is movable transversely and is mounted on a saddle that is movable in a longitudinal direction. The table is hydraulically traversed from one predetermined position to an-

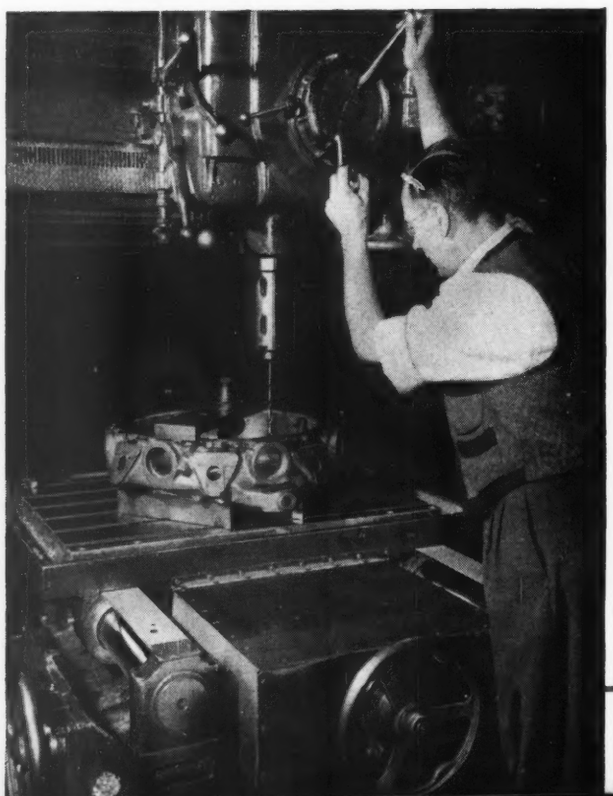


Fig. 1. Holes to be drilled in supercharger front housings are quickly located by means of the "Man-Au-Trol" spacer applied to a radial drilling machine



Fig. 2. Fine adjustments of stop-rod positions are made through adjusting screws. Positions can be held to within 0.0005 inch by the use of a dial indicator in combination with a micrometer and end gages

other by means of two selector controls. The transverse positioning selector has a dial that is lettered to correspond with similar alphabetical stop designations on the table. After positioning adjustable stop-rods to suit the required location of the table and setting the selector to the corresponding designation on the dial, the table is automatically moved to the desired position. Positioning of the saddle in a longitudinal direction is obtained in a similar manner. In this case, however, the dial on the selector and the stop-rods are numbered instead of lettered.

Hole locations are shown on prints and operation sheets by means of rectangular coordinates, which are easily determined mathematically or by the use of Woodworth circular tables. With prints dimensioned in this manner, the setting up of a machine for any given set of hole locations requires only that the operator add or subtract the hole location dimensions from an arbitrary reference position.

The table can be placed on center by means of a dial indicator in the drill spindle or it can be set to an extreme corner position—whichever provides the most efficient starting point for a particular job. Standard end measuring gages and an adjustable micrometer are used to facilitate the adjustment of the transverse and longitudinal positioning stops to the hole coordinates. The gages are placed in position on the machine in lengths equal to the result obtained by adding or subtracting the hole location dimension on the print from the reference point.

Positioning stop-rods are inserted into adjusting screws, as seen in the heading illustration, to control the travel of hydraulic cylinders that produce the longitudinal and transverse motion of the work-table. Each stop is adjusted by placing the required length gage in the V-way provided for this purpose, turning the selector to the letter or number of the stop to be adjusted, and revolving that stop, as shown in Fig. 2, until the table or saddle moves to the correct position, as shown by dial indicators on the table and saddle. This procedure is repeated until all the stops are set for locating the various holes to be drilled.

Once the stops have been set in this way, the positioning of the work is controlled entirely by the two handwheels on the "Man-Au-Trol" spacer, which provides automatic movement of the table and saddle to the lettered and numbered stop positions selected.

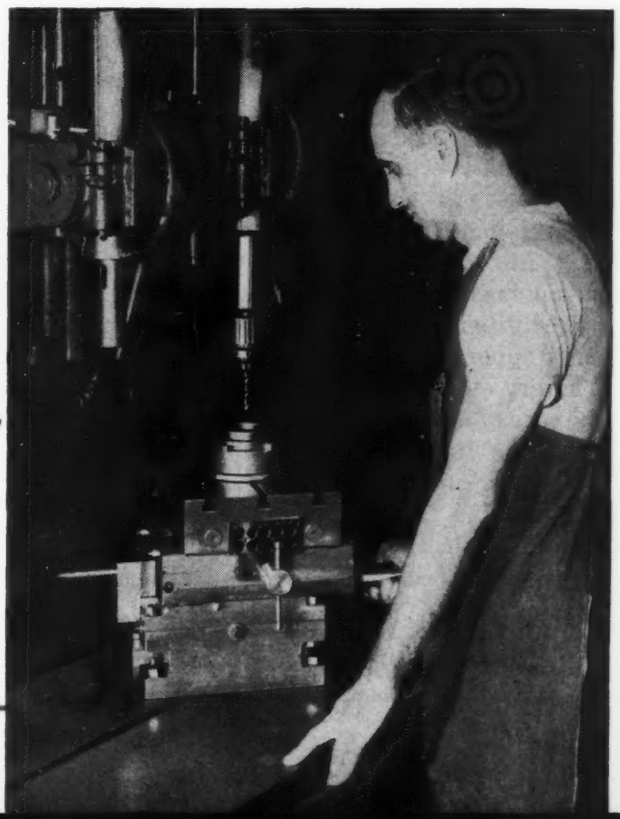


Fig. 3. Small parts made in limited quantities are quickly and accurately located without jigs or fixtures on a drill press by the use of a "Man-Au-Trol" spacer

A supercharger front housing for the Wright 800-H.P. seven-cylinder engine is a typical example of parts drilled with the "Man-Au-Trol" spacer. This particular part requires several holes 1.376 inches in diameter. While a typical replacement order amounted to only four parts, the hole sizes were held to limits of ± 0.001 inch. Another part requiring accurately located holes is a propeller shaft. This piece requires twelve holes, 0.625 inch in diameter. A replacement order of twelve was finished in twenty-four hours. For small work, such as fuel regulator and pump gear housings, starter gear housings, etc., a smaller model of the spacer is employed on drill presses having accurate spindles. Such an application is illustrated in Fig. 3, which shows the set-up for drilling four holes, 0.180 inch in diameter, in a starter gear housing. Ten of these parts were completely finished in one hour without the use of drill jigs or fixtures.

Replacement Formula for Machines

A GUIDE to determine when a machine is no longer economical to use and should be replaced has been developed by the Machinery and Allied Products Institute after more than three years of research by George Terborgh, Institute research director, in collaboration with a group of equipment manufacturers. As the result of this research, a "replacement formula" has been derived which is presented in a pamphlet entitled "MAPI Replacement Manual." The formula measures the imperfection in performance of a machine relative to the best alternative method or equipment available.

It is pointed out by William J. Kelly, president of the Institute, that while technology and managerial techniques in most fields have made tremendous progress in recent years, the method of determining when to replace equipment is as unscientific, in most cases, today as it was a hundred years ago. Most equipment replacement is based on "rule of thumb."

Two basic requirements of a good replacement policy are stated as follows:

1. A reliable technique for determining when equipment is economically replaceable, including, as an essential element, a measure of the cost of deferring replacement.

2. An organizational set-up to insure that management, including top management, is apprised promptly and fully of developing re-equipment opportunities.

Every enterprise should have an official, or in the case of a large company, a staff, charged with responsibility for keeping the equipment situation under surveillance and for marshalling and transmitting the necessary data to top management. Replacement analysis is a difficult task, calling for special training and experience. It should therefore be in the hands of specialists. No live industry can keep abreast of technology without continuous renewal and transformation of its productive facilities. Existing equipment must justify its use against the challenge of available alternatives. If it fails to meet this challenge, it must be displaced, regardless of its age or condition or of whether it is physically worn out. A re-equipment policy that fails to give full recognition of obsolescence is bound to lead to bad mechanization and inefficiency.

The manual is intended to serve as a guide to top management in determining sound replacement policy and to the specialist in analyzing the factors on which replacement decisions should be based.

* * *

The Story of Free Enterprise Brought into the Home

Many speeches and editorials dealing with the merits of the free enterprise system are directed toward businessmen, but seldom is the story told in the homes of their employes. With a view to educating the employe and his family on the fundamental principles of the system that gives us our high standard of living, the Free Enterprise Division, Wall Catalog Co., Chicago, Ill., has brought out a 52-page calendar which presents each week a different message about free enterprise. It calls the attention of the employe to the relationship between his job and his earnings; the cost of living and its relationship to taxes; his security and its relationship to the American way of life. The same messages are available in poster form, as well as in payroll insert sizes.

Cost-Cutting on Review

COMPETITION for markets both at home and abroad demands that product prices be as low as possible, consistent with a reasonable profit to the manufacturer. It is, of course, a fundamental principle that lower product prices can be attained mainly through reduced manufacturing costs. If high quality of the product is to be maintained, appreciably lower manufacturing costs can be achieved only by greater productive efficiency. As it is impossible to effect a reduction in labor and material costs, industrial concerns must try to cut costs by obtaining greater output per man-hour.

Today farsighted labor leaders and politicians are beginning to understand that wage increases must necessarily add to the cost of products unless accompanied by a corresponding rise in hourly productivity.

Cost-cutting in manufacturing operations depends greatly upon intelligent tool engineering; in fact, tool engineers may be called the "brains of mass production." Upon their ingenuity in devising efficient manufacturing methods depend the practicability and economy of the production processes that are employed in the shops of industry.

The progressive tool engineer is always on the lookout for new cost-cutting methods. He will have an exceptional opportunity to learn first hand about the advantages of the latest tooling developments if he visits the Industrial Cost-Cutting Exposition to be held by the American Society of Tool Engineers in Philadelphia's Convention Hall and Commercial Museum from April 10 to 14, inclusive. The indications are that this will be the most successful Show ever held by the Society.

To aid MACHINERY's readers in planning the most efficient use of their time at the Show, a map giving the lay-out of all booths is presented on the insert opposite this page. The names of all exhibitors registered up to February 3 are given on the back of the insert, together with their booth numbers. From this preview listing, those intending to visit the Show can schedule their daily itineraries in advance, an important advantage to visitors whose time will be limited. Incidentally, 305 exhibitors are listed on the floor plan, which should insure that every tool engineer will be amply repaid with practical technical knowledge for the time spent at the Show.

There will be a series of technical sessions at which papers will be presented by important engineers of the metal-working industry. In addition, a forum will be held at which outstanding economists will discuss economics as they apply to the problems of industry.

Truly, cost-cutting will be on review in Philadelphia next month!

Charles O. Herb

EDITOR

Single-Spindle Bar Automatics

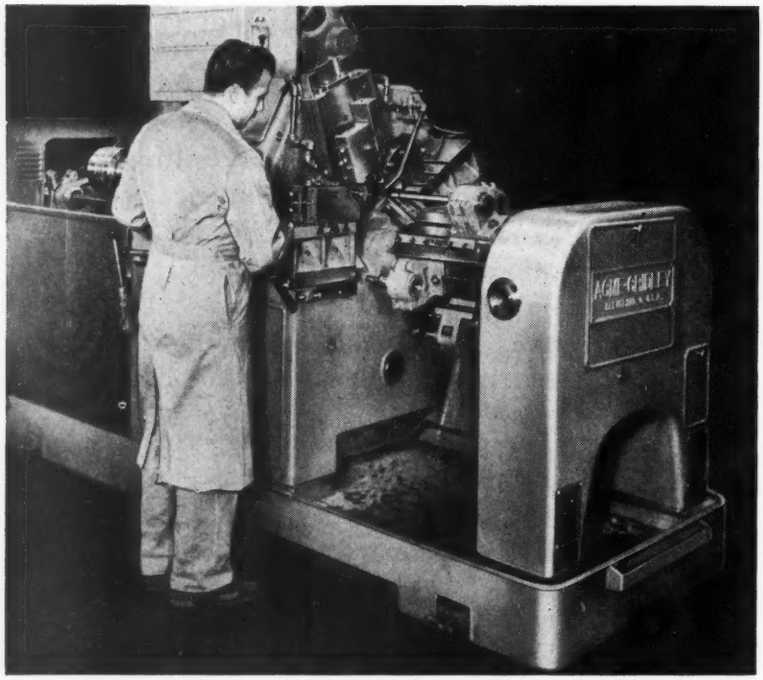


Fig. 1. Single-spindle bar automatic recently developed by the National Acme Co. for high-speed production through the use of carbide tools

FAST, economical production, simplicity of operation, and accuracy of results are the principal features of a new single-spindle bar automatic developed by the National Acme Co., Cleveland, Ohio. The high speeds and feed rates available on this machine permit full advantage to be taken of carbide tooling. Three angularly mounted cross-slides and a five-slide indexing turret are independently actuated, so that operations performed by the various tools can overlap or occur simultaneously. Idle time is thus reduced to a minimum.

Production rates up to ten times faster than those possible with previous models of single-spindle bar automatics built by the concern are obtainable. Flexibility of the standard tooling employed permits quick change-overs from job to job. Smooth surface finishes and a high degree of accuracy can be consistently attained.

The tooling provided on a typical job in which steel rollers 3 11/16 inches in diameter by 1 13/32 inches in length are produced at the rate of sixty-five pieces an hour is illustrated in Fig. 2. In the first position of the turret (not illustrated), the stock is fed into position. When the second side of the turret is indexed in line with the work, as shown at *X*, drill *A* cuts a 31/32-inch hole approximately half way through the part while tool *B* turns the piece for one-half its length and tool *C* chamfers the outside corner. All of these tools are mounted on the turret-slide.

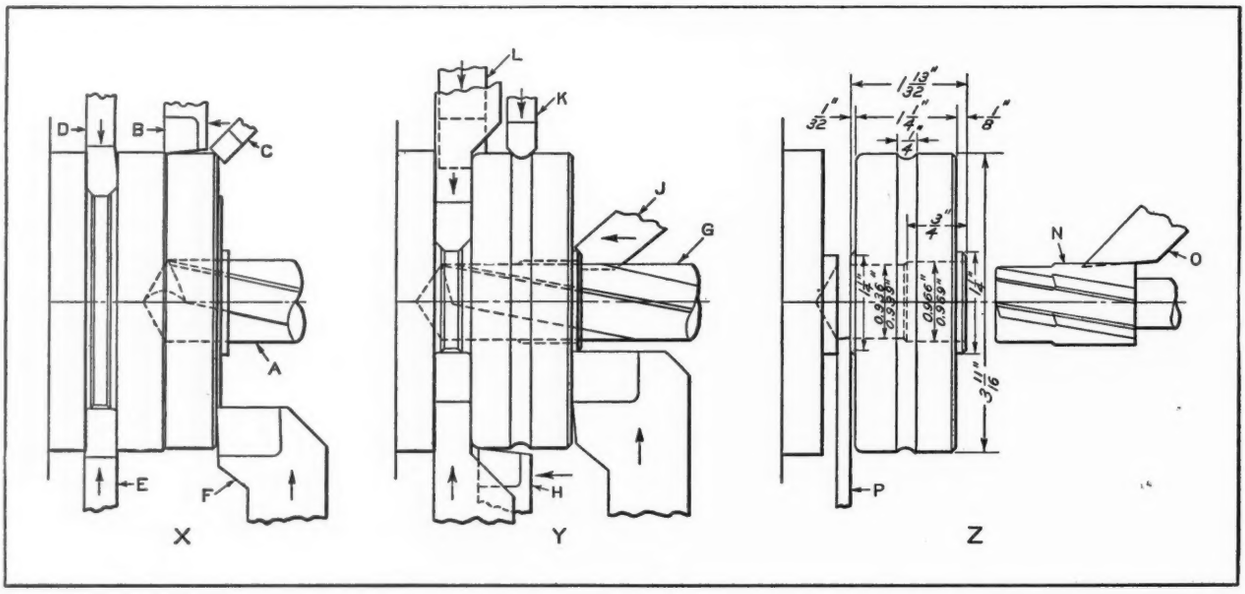


Fig. 2. Tooling provided on the single-spindle bar automatic for producing rollers at the rate of sixty-five an hour

Designed for Carbide Tooling

While these cuts are being taken, tool *D* on the rear forming slide rough-forms the back side of the piece and the rear hub while tool *E* on the front forming slide finish-faces the back side, finish-forms the rear hub, and rough-forms the front hub of the next piece to be produced. At the same time, tool *F* finish-faces the front of the roller.

In the third turret position, which is illustrated at *Y*, a 15/16-inch hole is drilled completely through the part by drill *G*, the remainder of the periphery is turned by tool *H*, and the front hub is chamfered and faced by tool *J*. At the same time, tool *K* on the rear forming slide forms a groove 1/4-inch wide around the periphery, and tool *L* rounds the rear outside corner. Tools *D* and *E* operate without interruption while the turret is in the second and third positions.

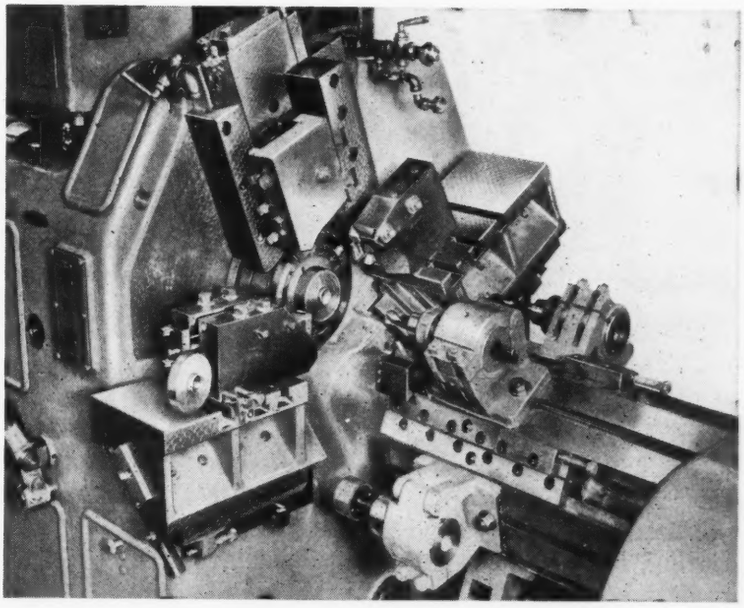


Fig. 3. Close-up view of the tooling area on a typical operation (not the one that uses the tools in Fig. 2). End-working tools and a stock stop are mounted on the five-slide turret at the lower right

In the fourth turret position, illustrated at *Z*, reamer *N* machines the two hole diameters to size within a total tolerance of 0.003 inch. The inside of the hole is chamfered on the front corner by tool *O*. While those cuts are in process, parting tool *P* on the top forming or cut-off slide starts cutting off the part. When the reaming and chamfering tools have withdrawn at the end of their cuts, the turret indexes into the fifth position and advances a pick-up bar. This bar receives the work-piece when it has been cut off and delivers it to a stock pan. Typical dimensions of the finished roller are given at *Z*.

As seen in Fig. 1, the five-slide indexing turret is rigidly supported between the headstock and an outboard support at the right, which is connected to the headstock by a triangular tie-piece at the rear of the machine. A close-up view of the easily accessible tooling zone is shown in Fig. 3. The three headstock slides are independently operated by disk cams located directly under the slides.

End-working tools and the stop for the bar stock are mounted on the five slides of the indexing turret. Threading is accomplished with self-opening dies or collapsible taps. Each of the turret-slides is independently controlled by cams on a drum in the headstock. Movement of all eight slides can thus be synchronized to minimize machining time. The length of travel of each slide, as well as the tool feed per spindle revolution, can be varied to suit the job, while the slides are being fed into the working position. The turret can be indexed while the forming tools are cutting.

The five-slide turret is indexed in one second by means of an independent electric motor and a Geneva movement located in the outboard support, as shown in Fig. 4. With this mechanism, it is possible to index the turret through one or more tool-slide positions, even while tools on the cross-slides are cutting. A limit switch prevents the turret from being indexed before the turret tool-slides have been retracted.

As many as three different speeds can be obtained without changing the spindle change-gears. This is accomplished by means of three automatic clutch-controlled gears that are driven through a gear train from the pulley shaft. By varying the change-gears, a spindle speed range of from 150 to 1550 R.P.M. is obtainable on the smallest machine (2 5/8-inch capacity), and from 28 to 545 R.P.M. on the largest machine, (5 1/2-inch capacity).

The feed control for the main camshaft is obtained through a direct drive from the main spindle, so that the tool-slide feed will always be in the proper relation to the work-spindle speed. With a few cams having different angles, and a selection of feed change-gears, the feed of

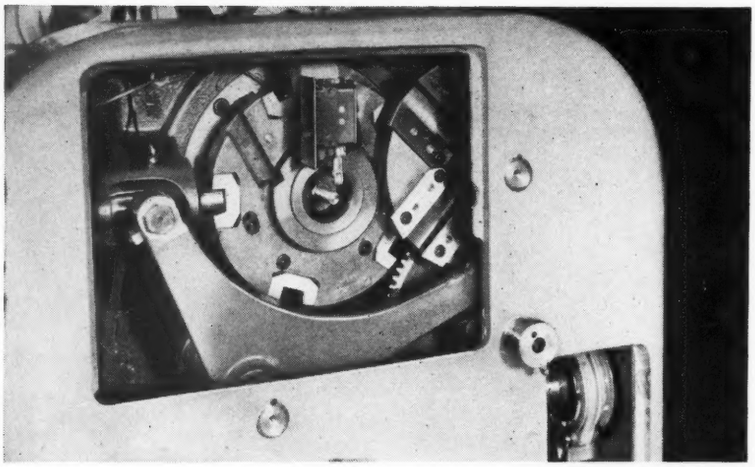


Fig. 4. The mechanism for indexing the five-slide turret is located in the outboard support. An independent motor and Geneva movement accomplish indexing in one second

the tool-slides can be varied from 0.004 to 0.0444 inch per spindle revolution. The feed change-gears and the spindle-speed change-gears are interchangeable.

Idle movements, such as chuck opening and closing, stock feeding, and tool-slide return, are rapidly accomplished by a constant-speed shaft driven directly from the pulley shaft—independently of the spindle speed or feed. A spring-feed type stock feed is provided, controlled by guide bars for the feed-tube and yoke. The main drive is actuated by a 25-H.P. motor.

* * *

Planer Time Calculator

A handy precision planer slide-rule has been produced by the G. A. Gray Co., Cincinnati, Ohio, manufacturer of planers, milling machines, and horizontal boring machines. With this device, the actual machining time for a planer equipped with a modern variable-voltage drive can be quickly and accurately calculated. On the reverse side of the calculator is a chart giving recommended planing speeds and feeds for machining cast iron, steel, bronze, aluminum, and plastics with high-speed steel and carbide tools.

New Officers of Aluminum Association

At the annual meeting of the Aluminum Association, held on January 17 to 19 in New York City, the following officers were elected for the ensuing year: President, R. S. Reynolds, Jr., of the Reynolds Metals Co., Richmond, Va.; vice-presidents, E. G. Grundstrom, Advance Aluminum Castings Corporation, Chicago, Ill.; M. E. Rosenthal, United Smelting & Aluminum Co., Inc., New Haven, Conn.; and George N. Wright, John Harsh Bronze & Foundry Co., Cleveland, Ohio. The concerns that are members of the Association account for all the primary aluminum production in the United States and about 85 per cent of the aluminum semi-fabricated products. Headquarters are at 420 Lexington Ave., New York 17, N. Y.

* * *

Gearing Industry Reports Increase

The gearing industry, as represented by members of the American Gear Manufacturers Association, reports an increase in business of 5.2 per cent in December, 1949, compared with the previous month. The A.G.M.A. figure for December was computed to be 242.8.



Slide-rule developed by the G. A. Gray Co. for calculating the time required for taking cuts of various lengths and widths on a planer at different feeds and speeds

Sharpening Cast-Alloy Milling Cutters for Greater Efficiency

By F. B. SILLS
Haynes Stellite Co.
Kokomo, Ind.

IN spite of the many advances in milling machines and cast-alloy cutting tools made in recent years, sharpening procedures in many shops today are the same as those employed when cast-alloy cutting tools were first put on the market more than twenty years ago. These procedures will not usually work on the new tools.

In the early days of the automotive industry, soft cast iron was used for many engine parts, and the original cast-alloy cutting tools (Haynes Stellite alloy No. 3) developed for this type of metal gave excellent service. With the rapid expansion of the industry, there was an ever-increasing demand for improved materials and methods, as well as for reduced production costs. Alloy cast iron, for instance, was introduced for the manufacture of cylinder blocks and cylinder heads; other parts were made lighter and more durable through the use of materials with greater strength and hardness than the ones previously employed. The cutting quality of cast-alloy tools, of course, also had to be improved to suit the new materials.

Both the hardness and abrasion resistance of cast-alloy cutting tools were increased in two successively improved grades of the original alloy, and finally an entirely new cutting alloy (Haynes Stellite 98M2 alloy) was introduced.

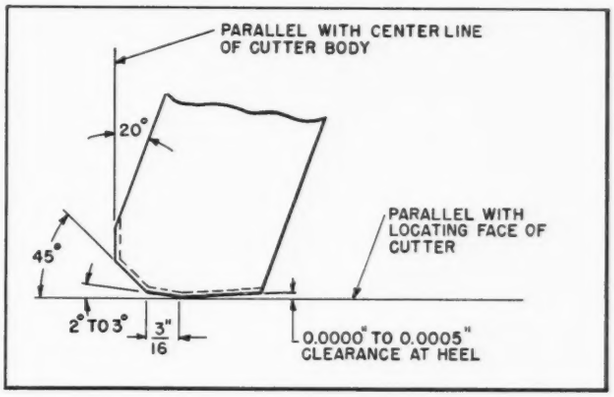


Fig. 1. Cast-alloy face milling cutters employed on cast iron should be provided with a lead angle of from 2 to 3 degrees by 3/16 inch long

However, sharpening procedures in most shops have not been changed enough to handle these new harder alloys properly.

The use of the proper grinding wheel in sharpening is the most important factor affecting the efficiency of cast-alloy tools. The wheel should be soft enough to break down in use. If a wheel of this type is chosen, new cutting points will constantly be presented to the work, and the wheel will stay sharp and free cutting. The wheel cost is actually but a small part of the total cost

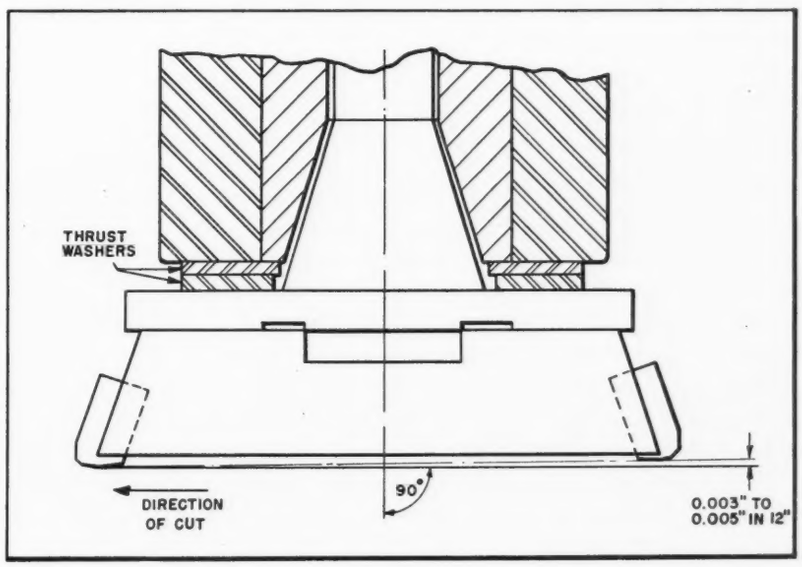


Fig. 2. Maximum efficiency can be obtained from properly sharpened milling cutters by maintaing parallelism between the cutter, faceplate, and thrust bearing

of sharpening, and cannot be compared with the cost of the tools. Consequently, there is no reason to try to economize in the grinding department and at the same time increase other production costs through inefficient tool life.

Before grinding wheels were made to the degree of uniformity attainable today, cast-alloy milling cutter blades were often ruined in sharpening. It was common practice to use a hard wheel for this purpose. This was done mainly because the operator could make a pass around a cutter without break-down of the wheel. However, the wheel would glaze and create a great deal of localized heat at the point of contact. This caused checking of the blades. A milling cutter with blades that have been weakened at the cutting edge by checking obviously will not machine as many pieces before dulling as a cutter that has strong, solid edges.

Today, the same condition exists in many large production shops. For example, in one of the big automotive plants, production was recently held up because the grinding department was not able to sharpen cutters equipped with cast-alloy blades. There was a great deal of chippage in grinding and many hours were lost. In addition, the dull cutters were piling up.

A survey showed that the trouble was caused by improper grinding technique and the use of wheels that were too hard. The operator was grinding toward the cutting edge with a hard wheel. This created excessive heat and checked the blades. When a softer wheel was used with the correct technique, the cutters lasted several times as long, thus more than offsetting the slight additional time spent in sharpening.

In many instances, the cutter grinding department is criticized unfairly when milling cutters do not perform satisfactorily. Whenever a poor finish—either from chatter or cutter run-out—is experienced, the blame is placed on the grinding department, and the foreman is asked to grind the cutter specially, in order to overcome the trouble. Thus, cutters are soon being ground specifically for certain milling machine spindles, and must be kept for that single use.

This situation puts an added burden on a department that is usually undermanned because it is considered a non-production unit—a burden that should never be allowed to exist. For it has been proved that if the spindles on the milling machine are in good repair and set correctly, all cutters can be ground the same and will be interchangeable for any operation that requires cutters of the same diameter.

The following sharpening technique for face milling cutters is the most universal for normal production operations on cast iron:

Face—Grind straight across to provide a clearance of 0.0005 inch at the heel, Fig. 1.

Lead—Grind lead angle of 2 to 3 degrees by 3/16 inch long.

Chamfer—Grind a 45-degree chamfer to suit the depth of cut.

Clearance—Clearance angles should be determined by experience with the material being machined. To obtain the best results from a correctly sharpened cutter, the spindle must be in good repair and set properly to clear the heel of the cutter blades. Also, the spindle bearing must be adjusted to assure the best possible bearing and thrust surface.

Setting Spindle—The common practice of a large manufacturer of milling machines in fitting spindles is to grind the tapered portion of the quill, and then machine and scrape the bearing until both the tapered area and the thrust washer are tight at assembly. Then 0.0015 inch is ground from the taper on finishing spindles, and 0.003 inch on roughing spindles. This allows a film of oil to lubricate the bearing area at the same time that the thrust bearing is in contact with the mating face. Thus, if the cutter, faceplate, and thrust bearing are parallel, the assembly will run true; and when the spindle assembly is set as shown in Fig. 2, maximum efficiency can be expected from a correctly sharpened cutter.

Too often the machine repair department will tighten the housing of a spindle and grind the thrust washer to keep a production machine in operation. This is false economy, since in most cases of this kind the bearing is out of round from wear and the action of tightening the housing. After a short time, this practice will result in poor finish on the work, and there will be a great loss of production due to short cutter life. However, if the right technique and the proper grinding wheel are used, cast-alloy cutting tools will give long life at high speeds and coarse feeds.

* * *

"Safety Oscar" for Outstanding Record

A record of more than 2,600,000 man-hours of work without a single lost-time accident recently earned 425 employes of the Westinghouse Electric Corporation a "Safety Oscar" in honor of their achievement. These employes are in the tool and special equipment department at the East Pittsburgh Works. They build tools, testing devices, jigs, new machinery, and dies, and repair or rebuild machinery from other departments in the plant. With such varied operations, accidents might easily occur if it were not for the continued observance of the safety program and rules.

Quality Control Indicator Helps Keep Rejections at Low Levels

A NEW electrical instrument that maintains a constant check on the rejection level of a production process or operation and gives immediate indication when a pre-established level is exceeded has been developed by the General Electric Co. This instrument, called the Quality Control Indicator, eliminates much of the calculation, plotting, and interpretation of quality control data gathered on the production line, so that the customary time lag between the appearance of unusual conditions causing rejections and their correction is kept at a minimum.

The Quality Control Indicator consists of two units—a totalizer, which counts the units inspected, and a characteristic analyzer, which "computes" the percentage of rejections for a given characteristic, such as size, surface condition, concentricity, etc.

The total number of units may be counted photo-electrically, as in the case shown in Fig. 1, where refrigerator compressors are shown moving along an assembly line. The inspector registers the rejections by pushing a button whenever a unit fails to meet a given requirement. A push-button panel for the refrigerator assembly line is shown in Fig. 2. It will be noted that the buttons are labeled with the names of defects for which the inspector at this point is testing. Each push-button is connected with a separate indicating unit which shows the rejection level for that particular defect.

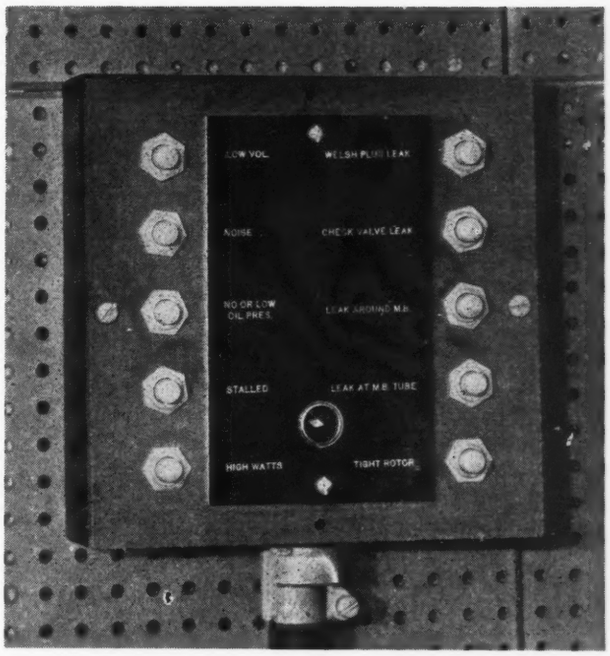


Fig. 3 illustrates a bank of quality control indicating meters, which may be located at some convenient point remote from the production line. Each one has a scale divided into two areas —red and green. When the pointer is in the green area, the rejection level is below the pre-established allowable level. When the pointer moves over to the red area, it is a signal that some unusual condition has occurred which is causing an abnormally high percentage of rejections. The pre-established rejection level is set on each meter by means of a quality level selector knob having a scale reading from 0 to 1 per cent or from 1 to 10 per cent, depending upon the range required.

A totalizer unit is in one of the larger cases shown at the left of Fig. 3. The count of the

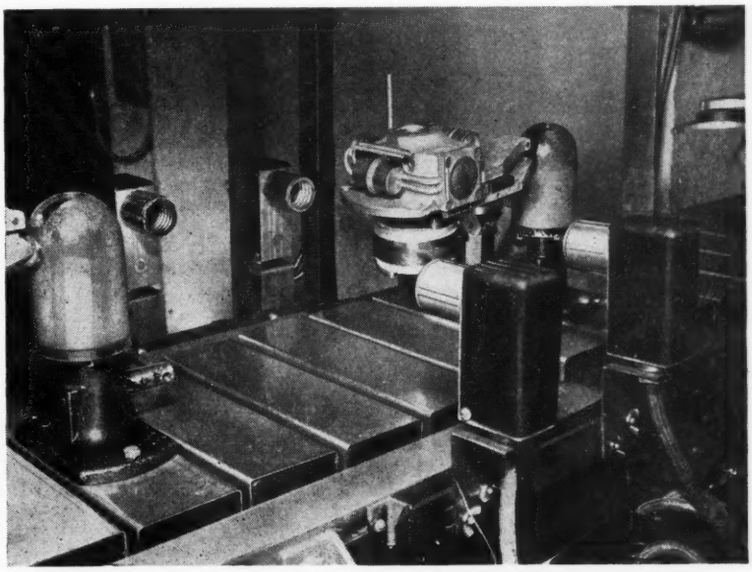


Fig. 1. (Left) Photo-electric "eyes" count refrigerator compressors as they move along the assembly line and transmit the count to the quality control totalizer

Fig. 2. (Above) Push-button panel at inspection station on refrigerator assembly line. Each button stands for a given defect for which a test is made at this point. The inspector pushes the proper button each time a defect occurs

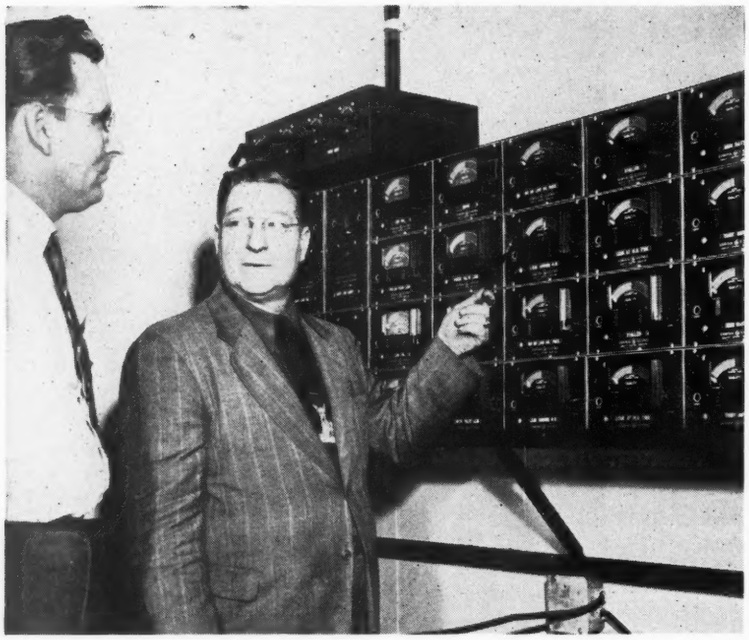
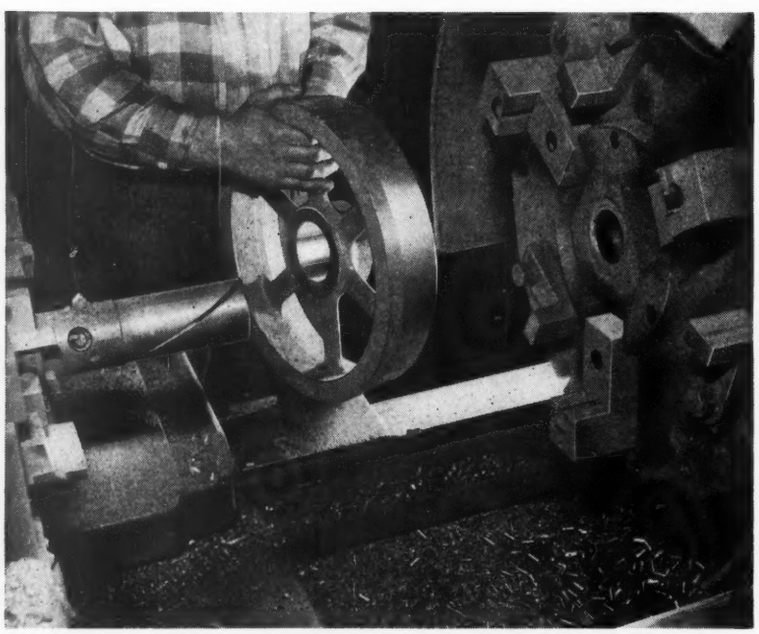


Fig. 3. Quality control analyzer units show continuously whether the percentage of rejections is satisfactory (green area at left of dial) or unsatisfactory (red area at right of dial). Pre-established rejection levels are set on the unit by an indicator knob. Each unit records a particular defect. Larger units at left register total number of units inspected

total number of parts being inspected is registered in the three dial windows on the front panel of the unit. Thus, in effect, the quality control indicator continuously compares the number of rejections with the total number of units inspected, and shows at once whether the rejection level is satisfactory or whether conditions exist that should be corrected. The new quality control instruments are being made available for general industrial use.

Bracket Support on Lathe Bed Helps in Loading Work

Brackets bolted on the carriage apron of two lathes used in machining sheaves in Allis-Chalmers shops have proved helpful in protecting the bed ways of the machines. It was the habit of the lathe operator to lift the heavy sheave to the ways and rest it there before loading it into the chuck. The reverse practice was followed in unloading the work, with the result that considerable wear occurred on the ways. Since the provision of a bracket on these machines, as shown, the operator rests the sheave on the bracket and the ways are undamaged. The idea was suggested by James McGee, machine operator.



The use of a bracket for supporting heavy work in loading and unloading lathes saves wear on the bed ways of the machine

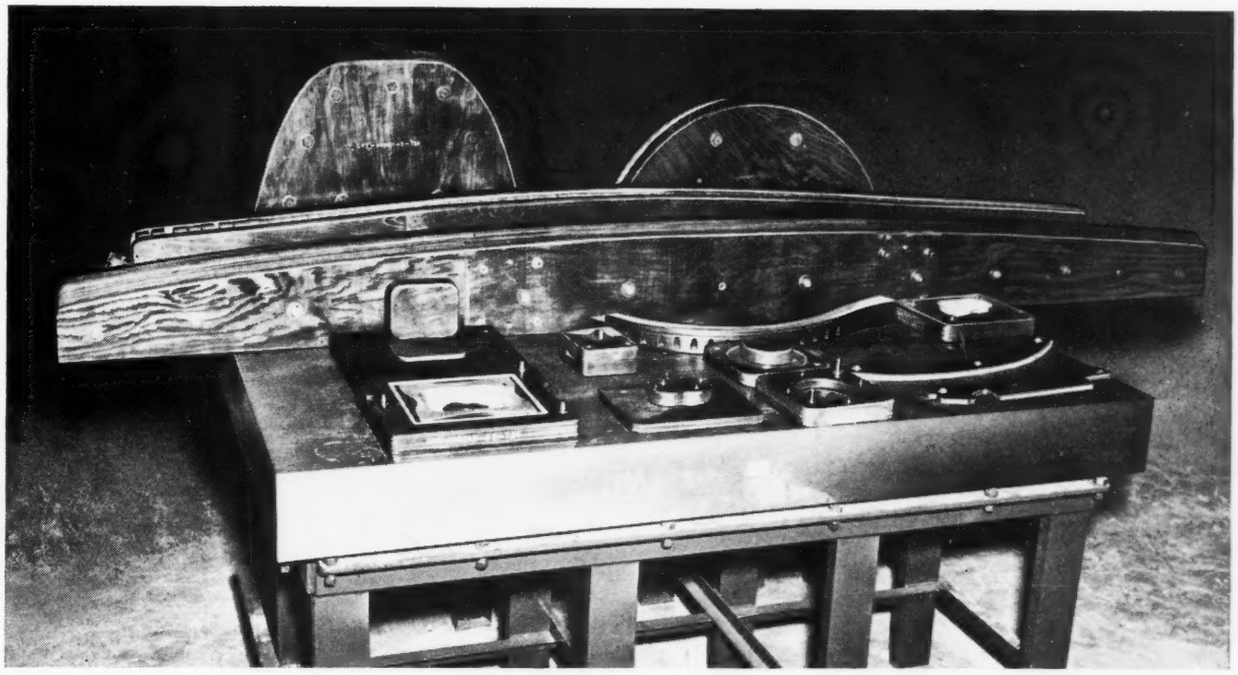


Fig. 1. A number of Compreg dies used for forming aircraft parts. Densified wood is particularly well adapted for large-stretch forming blocks, such as those seen at back of the table

Densified Wood Used in Aircraft Tooling

A WARTIME expediency that grew out of a material shortage—the use of densified wood or "Compreg" to replace steel and aluminum in the tooling for aircraft frames—has found an even greater application in post-war aircraft manufacture. Today, the Chance Vought Aircraft plant at Grand Prairie, Texas, uses Compreg for about 70 per cent of its blocks for stretch forming and dies for rubber forming.

The possibility of using this material was first investigated by Chance Vought in 1943. With a critical shortage of both steel and aluminum, an attempt was being made to find materials for aircraft tooling that were more easily obtainable. The Forest Products Laboratory had already developed densified wood. It subsequently licensed the Parkwood Corporation, Wakefield Mass., among others, to manufacture it in various thicknesses. The dies and form blocks here illustrated were made from Compreg, produced by the Parkwood Corporation.

Densified wood is produced by soaking veneers of hard wood—either maple or beech—about 1/16 inch thick, for several hours in light-viscosity phenolic resin. When the pores of the wood have absorbed the liquid, the veneers are dried. Later, they are stacked to obtain the desired thickness, and pressed together on the heated platen of a press for about half an hour. The pressure simultaneously cures the phenolic resin

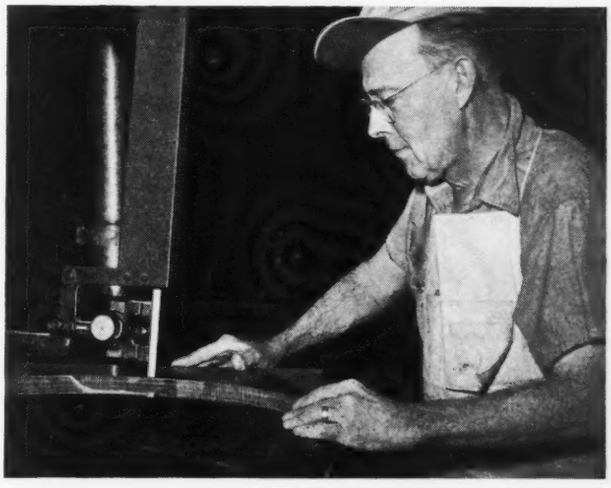


Fig. 2. Densified-wood dies can be quickly and economically produced by means of standard woodworking tools. Flat sheets of this material are generally cut to shape on a band-sawing machine



Fig. 3. Samples of the parts produced by densified-wood dies. Such dies are suitable for forming both aluminum and steel, but cannot be used for the hot-forming of magnesium

and bonds the veneers together. So thorough is the impregnation of the phenolic resin that the material is no longer wood, nor yet plastic, but a combination of the two. It is a material ideally suited for making airframe dies and other tooling.

Shrinkage or warpage is negligible in dies made of Compreg. Such dies have good thermal stability, and since they weigh only a sixth as much as steel, they are easier to lift and handle. During the war, when many women were employed in the aircraft plant, this characteristic was particularly valuable.

Compreg has good wearing qualities. While it does not have quite the durability of steel, it has more than enough for the limited quantities and frequent changes in design encountered in present-day aircraft manufacture. For example, in the operation of planishing or hand-hammering—a job that causes great strain on the die—a die of this material will be suitable for forming about 200 parts of average thickness. For this purpose, Compreg is preferred to aluminum and other casting alloys. At the present time, it is seldom that as many as 200 aircraft parts of identical design are needed.

The consideration that has perhaps had the greatest influence in the wide use of densified wood in airframe tooling is the ease and speed with which it can be worked. A woodworker can

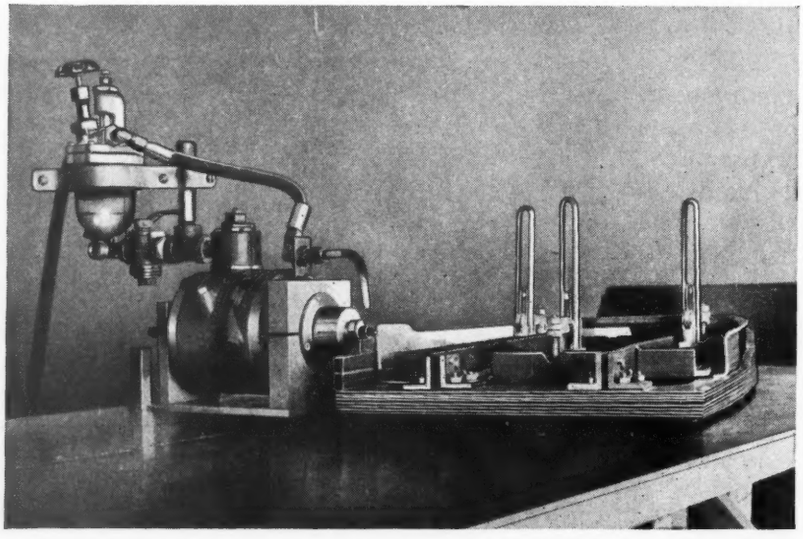


Fig. 4. Densified-wood form block being employed in routing the leading edge of an aircraft wing. The part to be trimmed is held in the form block by swing clamps

complete a Compreg tool in half the time that would be required for one made from metal. The Compreg, as received, has a satisfactory surface. It is merely a matter of cutting shapes out of the flat sheet with a saw, Fig. 2, and filing and sanding the shape to the tolerance specified. The saving effected in the manufacture of tools and dies from this material is, therefore, substantial. Taking the difference in volume into consideration, Compreg is cheaper than aluminum. While it is slightly higher than steel, the saving in labor makes up many times for this small additional expense.

Compreg has found many uses in airframe manufacture. Some parts produced on dies made from densified wood are seen in Fig. 3. Besides being used as forming dies for sheet metal, it is ideal for aluminum spinning fixtures. Because of its non-conductive qualities, effective spot-welding fixtures of Compreg have been developed. It is used for dies and molds employed in the low-pressure laminating of Fiberglas, for routing fixtures, for master tool models, and for mechanical press dies.

A densified-wood form block for routing the leading edge of an aircraft wing is seen in Fig. 4. The part to be trimmed is clamped in the form block on the table of the routing machine. The block is fed past the cutter, keeping the Compreg guide strips in contact with the roller located directly behind the routing tool, thus trimming the part to the desired shape.

Dies of this material are also widely used in forming aluminum and stainless-steel parts. In hot forming operations, or where magnesium parts are involved, Compreg cannot be used. With limited production contracts, and work on experimental models, today's combined high material and high labor costs have been effectively balanced by the economy which the use of this material affords.

* * *

Roller Bearings Reduce Size and Cost of Sugar Mill Machinery

The large grooved rollers of a sugar mill recently built in the machine shop of the Derrick & Hoist Co., Inc., Long Island City, N. Y., for installation in Costa Rica are each mounted on two SKF self-aligning spherical roller bearings. These bearings are protected by special housings equipped with labyrinth seals. The drive-shafts are supported on six pillow blocks, each of which is also supplied with anti-friction bearings. It is claimed that the use of roller bearings in this equipment has permitted a lighter construction than is normally required and lower costs.

Reasons for the Productivity of American Machine Tool Plants

Trade union representatives from the French machine tool industry who were members of a productivity team that recently made a five-week visit to plants in the United States have reported that our productive techniques could be used to advantage in France. In analyzing the differences between our methods and the French techniques, one representative stated that factors contributing to our high productivity include plant lay-out and the one-floor system, which facilitates the flow of work and materials. There is more floor space available per man and per machine, and there are wider passageways for the movement of work in process.

He pointed out also that an intelligent grouping of machines avoids waste motion in the flow of materials and reduces both working time and the cost of machine maintenance. Material-handling equipment, such as hoists, cranes, and fork-lift trucks, are not readily available in France, and the space required for such equipment is extremely limited. Another factor that helps to increase our productivity was said to be the more widespread use of small power hand tools in the United States.

On a comparative basis, the average age of our machine tools is low, according to this representative, and only one machine is generally used for one operation, whereas in France the machines are older, and it is necessary to use one machine for several operations, with subsequent loss of operating time due to the necessity for frequent retooling.

* * *

Peep-Hole Facilitates an Assembling Operation

The meshing fit of a small intermediate control gear and pinion unit in a product of the Allis-Chalmers Mfg. Co. is effected by positioning the stub shaft on which the unit rotates. This is done by making an adjustment from the outside of the gear-box which encloses the mechanism.

To improve the accuracy of this assembly procedure, detail assembler, Carrol Hintz suggested that a peep-hole be provided in the gear-box that could be sealed by a standard pipe plug after the stub shaft had been properly positioned and doweled in place. This simple expedient has eliminated costly readjustments and redoweling of the stub shaft, which were sometimes necessary with the blind method of assembly due to faulty positioning of the shaft.

Engineering News

Small Gas Turbine for General Use Develops 160 Horsepower

One of the latest developments in the field of gas turbines is a unit recently brought out by the Boeing Airplane Co., Seattle, Wash., for general applications. This gas turbine has a continuous output rating of 160 H.P., with a 200-H.P. emergency rating, and weighs only 185 pounds. It consists of two major parts—the power producing section, made up essentially of a single-stage centrifugal compressor, two can type burners, and an axial-flow turbine wheel; and the power output section, containing a gear-box, shaft, and turbine wheel.

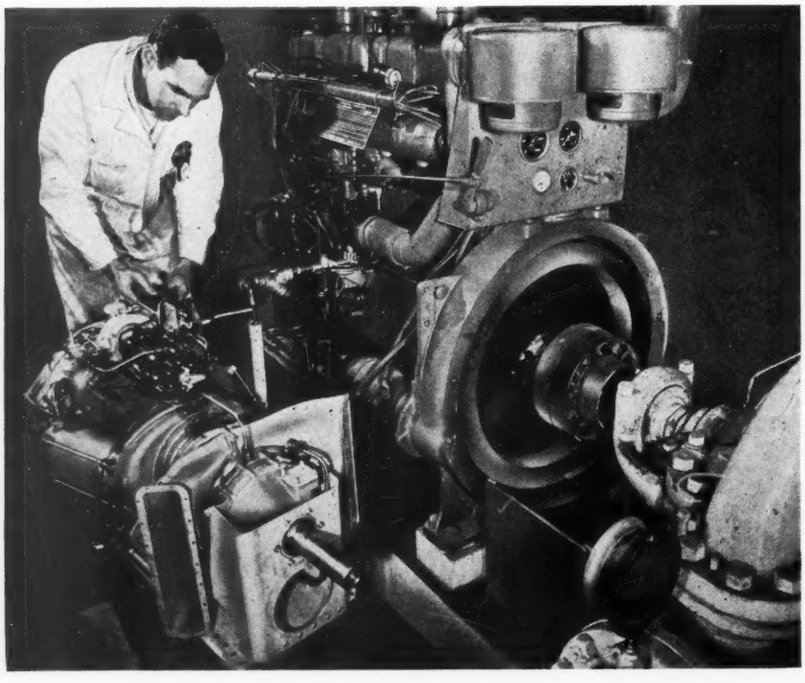
A unique feature of this turbine is the absence of a mechanical link between the two sections, which permits the speed of the power producing section to be controlled independently of the output-shaft speed. This provides a means of running the compressor at an efficient speed while the shaft speed is varied to suit the load.

Gases travel from the first-stage turbine wheel, which rotates at 36,000 R.P.M., through a nozzle box and are expanded through the second-stage wheel, which drives the output shaft. This second-stage wheel rotates at 22,500 R.P.M. and drives the shaft through reduction gears in the ratio of 9 to 1, reducing the speed to 2500 R.P.M. The friction load is light and starter power requirements remain nearly constant, even in sub-zero weather. It is expected that, at —65 degrees F., the turbine can be started and warmed up, and the throttle opened to full power in sixty seconds.

In the aircraft field, the Boeing turbine has three definite applications. It will provide a quick starting ground power unit for servicing large aircraft and it can be used as a source of auxiliary power aboard these planes. Since it is in the same horsepower class as the power plants of the Boeing L-15 Scout, the Bonanza, the Navion, and small helicopters, it can also be applied for aircraft propulsion. Other uses include industrial equipment. Such an application is shown in the accompanying illustration, which gives an idea of the small size of the turbine as compared with an engine of approximately the same horsepower used to drive a pump.

Portable Instrument for Detecting Radioactivity

Radioactivity can be measured at a safe distance from the source by means of a portable gamma survey meter recently announced by the General Electric Co. The detector, located at the tip of a probe 4 feet long, converts radioactive emanations into electrical energy. It consists of



Small Boeing gas turbine (at left), weighing 185 pounds, that has approximately the same horsepower as the engine shown at the right, which is used to drive a pump

an electronic tube and a phosphorous material which emits light in the presence of radioactivity. This light acts on the electronic tube, which converts the light energy into electrical energy and amplifies its magnitude. Current of 1000 volts is supplied by low-voltage batteries enclosed in a box that can be suspended from the shoulder of the user.

Unusual Brass Mill Problem Posed by Nuclear Physics Research

Twenty-three thousand feet of high-conductivity, soft-annealed copper bar was required by the Brookhaven National Laboratory of Associated Universities, Inc., Upton, L. I., for use as magnet winding for the "Cosmotron," or proton synchrotron, a huge atom smasher. Two sizes of bars were needed, the larger having a cross-section of 2.182 inches by 0.750 inch, in lengths varying up to 52 feet 6 inches, and the smaller bars, a cross-section of 1.875 inches by 0.750 inch, in lengths varying up to 47 feet 8 inches.

An important requirement for these long conductors was a small hole extending through their entire length for carrying cooling water. Tolerances were moderate, but the specifications required that the hole have an area of 0.0941 square inch and it had to fall within a 1/2-inch circle at the true center of the cross-section.

These special bars, which weighed 150,000 pounds, were produced on a 2500-ton extrusion press in the Buffalo plant of the American Brass Co. Anaconda electrolytic tough pitch copper was the material used.

World's Largest Motors Deliver 65,000 Horsepower

Two giant synchronous motors of 65,000 horsepower each have been shipped by the General Electric Co., to the Bureau of Reclamation for installation in the new pumping plant at Grand Coulee Dam on the Columbia River. These motors will drive the world's largest pumps, each of which has a capacity for pumping more than one billion gallons of water per day. The motors weigh over 330 tons each, are 25 feet high, and measure 100 feet around the base.

Permanent Magnet for Holding Cabinet Doors Closed

The doors of cabinets or tool cupboards on shop benches or in tool-cribs can now be held firmly closed by means of a permanent magnet known as the Leco-Latch, which is manufactured by the Laboratory Equipment Corporation, St. Joseph, Mich. The permanent magnet is made with a lug having holes for screws that enable convenient attachment to the cabinet proper. A small steel plate having the same area as the front of the magnet is attached to the cabinet door. When the door is closed the magnet holds it shut firmly and yet it can be easily opened.

X-Ray Microscope Developed by General Electric Co.

An X-ray microscope, which makes visible internal details of materials through which light cannot pass, has been developed by the Research Laboratory of the General Electric Co., Schenectady, N. Y. The microscope consists of an X-ray tube and a pair of curved mirrors which the X-rays strike at an angle of less than 1/2 degree after having passed through the sample.

The mirrors, acting in a manner similar to that of a convex lens with a light beam, bend the rays in such a manner as to form a magnified X-ray image of the sample on a photographic film. The instrument is still in the laboratory stage of development, but clear, sharp X-ray images capable of being magnified 100 diameters have been produced.

Aluminum Flash-Welded to Other Metals by Improved Techniques

Improved percussion welding methods have been developed, according to the *Technical Advisor,* published by the Reynolds Metals Co., Louisville, Ky., which make it possible to flash-weld aluminum tubing directly to copper, stainless steel, Monel metal, or other alloys. This is done by reducing the fusion zone in the weld to less than 0.001 inch in width. Such a fusion zone is so small that practically no intermixing of the elements occurs.

Another important advantage of the new technique is that no change occurs in the grain structure of the metal beside the weld. This opens up a whole new field for the application of aluminum tubing and extruded shapes, which can now be welded in the heat-treated condition with hardly any decrease in strength through the weld. Thus, high-strength aluminum alloys can be heat-treated at the mill and welded by the fabricator without materially reducing the mechanical properties of the heat-treated aluminum. In this way, difficulties formerly encountered in heat-treating large or complicated welded assemblies are eliminated.

Materials of Industry

THE PROPERTIES AND NEW APPLICATIONS OF MATERIALS USED IN THE MECHANICAL INDUSTRIES

Aluminum Redraw Rod and Round Drawn Wire

Availability of 3/8-inch aluminum alloy redraw rod and round drawn wire has been announced by Kaiser Aluminum & Chemical Sales, Inc., Oakland, Calif. Both of these products are being made in the following aluminum alloys: 2S, 3S, 52S, 61S, 43S, and 150S. The finishing characteristics of 150S rod and wire are said to be of especial interest to manufacturers of products where fine appearance is desirable.

Redraw rod is available in both annealed and as-fabricated tempers (O and F). Round drawn wire is supplied in coils with standard tempers and diameters ranging from 0.051 to 0.250 inch. 201

Pattern Plastic for Precision Investment Casting

A pattern plastic known as ARD-Lustrex 15K has been developed by the A. R. D. Corporation, 70 Pine St., New York 5, N. Y., for use in precision investment casting. This plastic can be molded in cast molds, and at the low pressures usually available in wax molding machines. Patterns made from this material do not require particular care in handling, and can be stored indefinitely without danger of distortion.

In drying and firing, no mold cracks are said to result, due to controlled expansion properties of the plastic; no burning need take place within the mold; and no ash is left after firing. 202

Chemically Inert Packing Available in Molded Form

The Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill., has announced that "Chemlon," a chemically inert packing material, is now available in molded form in a wide variety of shapes. In the new molded form, Chemlon retains all of the chemically inert properties of the familiar braided packing. It is not attacked by any acids or alkalies, and is effective up to temperatures of 450 degrees F.

The special molding process developed by the manufacturer results in high flexibility. This is particularly helpful in the installation of packing rings. When split, they can be twisted and placed directly on the shaft without the necessity of completely removing the gland.

Among the many molded forms now furnished are washers, bushings, self-sealing "V" cross-section rings, and gaskets. Special shapes can also be molded to suit individual requirements...203

New Precipitation-Hardening Stainless Steel

A new precipitation-hardening stainless steel with the strength and hardness of high carbon spring steels and a corrosion resistance closely approaching that of 18–8 stainless steel has been developed by Armco Steel Corporation, Middletown, Ohio. This alloy, called 17–7 PH stainless steel, not only broadens the field of application for stainless sheet, strip, plate, and wire, but is said to have a unique combination of properties not previously available in a stainless alloy.

In addition to its corrosion resistance and high strength and hardness, the new steel has good elastic properties, fabricating flexibility, and low-temperature hardenability, and is especially recommended for use in the chemical, petroleum, textile, and food producing industries for springs, pressure tanks, diaphragms, conveyor parts, washers, and similar parts. It is particularly suitable for applications in the aircraft and automotive industries. Of particular importance in these fields is the fact that the yield strength in compression is approximately equal to or higher than the yield strength in tension.

In the soft temper condition, the alloy can be severely formed or drawn and welded by resistance, metallic-arc, and inert-gas shielded-arc methods. After fabrication, its full strength and hardness are developed by heating at 1400 degrees F. for thirty minutes, air cooling, and then heating to from 900 to 950 degrees F. for thirty minutes, followed by air or furnace cooling.

Hard temper 17–7 PH sheet and strip have fabricating properties equal to Type 301 full

hard temper stainless steel. In this condition, the new steel can be punched, blanked, flanged, and dished to a moderate degree. Tensile strengths over 255,000 pounds per square inch and hardnesses above 51 Rockwell C are developed by simply heating the metal to 900 degrees F. for one hour and air or furnace cooling. Higher strength and hardness are possible in very thin gage material.

Hard temper 17–7 PH wire can be wrapped on its own diameter, indicating its adaptability to the manufacture of spring and spring wire products. Properties similar to those of the best carbon steel music wire are developed by hardening at 850 degrees F. for a minimum of four hours and air cooling.

Since low temperatures only are required in the heat-treatment of this new alloy, it has additional important advantages. The hardening process is not only simple and economical, but cracking, distortion, and decarburization are said to be virtually eliminated. In addition, there is no heavy scale formation to complicate finishing processes. The extremely light scale formed at 1400 degrees F. and the heat tint produced at 850 and 900 degrees F. are both easily removed by a solution consisting of 10 per cent nitric acid and 1 per cent hydrofluoric acid..204

Aluminum Brazing Wire with Increased Corrosion Resistance

Air Reduction, 60 E. 42nd St., New York 17, N. Y., has recently brought out a No. 718 aluminum brazing wire to replace the No. 716. Joints made with the new wire are more resistant to corrosion and parts required to withstand pressure show fewer leaks than when joined with the previous wire. The No. 718 aluminum brazing wire is supplied in 3/32- and 1/8-inch diameters. 205

Facsimile Method of Checking Machined Finishes

An effective method for checking the condition of new or worn machined surfaces of mechanical parts such as gears, turbine blades, boiler tubes, journals, bearings, valve facings or seats, flanges, headers, cylinder liners, etc., has been developed by Marco Chemicals, Inc., Sewaren, N. J., in cooperation with the Naval Boiler and Turbine Laboratory, United States Naval Shipyard, Philadelphia, Pa.

The new method makes use of a special liquid casting plastic which is supplied in a kit. Each kit contains the casting resin and a catalyst, which, when combined with the resin, will cause it to solidify in approximately fifteen minutes. The catalyzed plastic resin is poured against the surface to be checked, and is removed when hard. It provides an accurate and permanent record, reflecting the surface condition of the machined piece. For surfaces where the liquid resin would run off, an adhesive tape is used to form mold walls and hold it until solidified. 206

Thermosetting Resin Adhesive for Rigid Materials

A thermosetting resin adhesive that joins metals, glass, ceramics, plastics, wood, and numerous other rigid materials to themselves and to each other has been placed on the market by the Armstrong Products Co., 395 N. Broadway, Burket, Ind. The resin mixture, known as "Adhesive A-1" contains no volatile solvent and does not shrink or swell upon hardening, but sets to a rigid solid. Since this adhesive contains no volatile constituents, it can be used as a gap filling material. Materials to be bonded together may be assembled immediately after application of the adhesive.

Armstrong Adhesive A-1 has been used for such applications as bonding aluminum alloy spacers to steel disks in magnetic fluid clutches, which operate at temperatures as high as 200 degrees F.; bonding steel housings to steel in large bearings; repairing broken aluminum castings; bonding plastic sheet materials to aluminum and steel; caulking fabricated aluminum-alloy tanks, etc. 207

Plastic Protective Coating for Metal, Wood, and Concrete

The U. S. Stoneware Co., Akron, Ohio, has recently announced an addition to its line of Tygon protective coatings. The new paint coating, designated Series K, is a self-priming vinyl-base paint that adheres tightly to metal, wood, or concrete. This self-priming paint was developed primarily to fill the need for an easily applied protective coating to resist corrosive conditions not sufficiently severe to warrant the use of multiple coats.

For normal conditions, two or three coats of the new paint provide effective and long-lasting protection. It shows excellent resistance to corrosive fumes of almost all acids and alkalies, as well as to excessive humidity, grease, oil, and alcohols, but is softened by aromatic hydrocarbons, ketones, and esters. This paint is non-oxidizing, non-inflammable when dry, and possesses an upper temperature limit of approximately 200 degrees F. 208

Penetrating Oil for Rusted or "Frozen" Metal Parts

A fast-acting, lubricant-base penetrating oil with a high degree of capillary action for positive penetration of rusted or "frozen" metal parts has been announced by the Ensign Products Co., Cleveland, Ohio. This oil, called "318 Pen-a-trate," which is not a solvent, is said to be one of the few penetrating oils that does not contain kerosene. The penetrant may be sprayed or dripped over the parts to be loosened, or the parts may be dipped or soaked in it.

When this fast-acting penetrant is applied to threads, bushings, etc., before assembly, it is said to assure a smooth entry, faster run-on, and tight fit, while guarding against corrosion...209

Metal Primer that Adheres Readily to Aluminum

The Di-Noc Co., 1700 London Road, Cleveland, Ohio, has placed on the market a metal primer known as "Di-Noc Metal N33." This product is designed especially for aluminum, but is adaptable for application to steel and other metals. It has good adhesion to aluminum without special preparation, as well as high abrasion resistance. After application of the primer, a coating of almost any standard finish, such as lacquer or enamel, can be applied. 210

Flexible Coating for the Protection of Metal Surfaces

A compound known as "Rustarest No. 30" for protecting aluminum, chromium, and ferrous or non-ferrous metals against corrosion, has been placed on the market by the International Rustproof Corporation, 12507 Plover Ave., Cleveland, Ohio. It provides a clear, transparent coating that dries quickly without need of baking. The Rustarest coating will not chip or crack under normal fabrication, and when used as a primer, it prevents paint from chipping off. It expands and contracts with the metal, regardless of temperature extremes, intense vibration, or abnormal flexing, and can be used to protect the surfaces of parts during shipment or storage...211

Burnishing Composition for a Variety of Metals

Chemclean Products Corporation, 64 Sixth Ave., New York 13, N. Y., has developed a burnishing compound called "Burnish-All" that can be used on a variety of metals. This compound is said to produce a more brilliant luster on most metals and their alloys in less time than is usually required. It is equally effective when used either with a burnishing medium or in self-rolling operations. 212

Rust Inhibitive Primer Available in Improved Form

A rust inhibitive paint primer and finish coat manufactured by the Wilbur & Williams Co., Boston 15, Mass., has been improved to give deeper penetration, a high gloss, and tougher weathering properties. "Totrust," as this primer is called, penetrates into the rusted areas of metal surfaces and inhibits rust at its source to control further corrosion. When painted over damp surfaces, it squeezes moisture to the surface of the primer through capillary action..213

To Obtain Additional Information on Materials of Industry

To obtain additional information about any of the materials described on these pages, fill in below the identifying number found at the end of each description—or write directly to the manufacturer, mentioning name of material as described in March, 1950, MACHINERY.

No.	No.	No.	No.	No.	No.	No.	No.	No.	No.

Fill in your name and address on the blank below. Detach and mail within three months of the date of this issue to MACHINERY, 148 Lafayette Street, New York 13, N. Y.

NAME..... **POSITION OR TITLE**.....

[This service is for those in charge of shop and engineering work in manufacturing plants.]

FIRM.....

BUSINESS ADDRESS.....

CITY.....**STATE**.....

Finding Width of Gage for Checking Circular Ring Segment

By HENRY R. BOWMAN

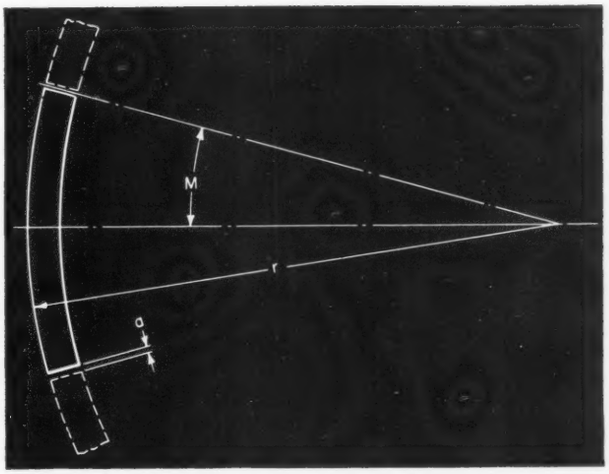


Fig. 1. Circular ring segment of outside radius (r) and half-angle (M) is to be cut with a parting tool of width (a)

A CIRCULAR segment is to be cut from a ring with a parting tool of width a, as shown in Fig. 1. The angle M between the center line of the ring segment and the center line of the cut, as well as the outside radius r of the segment, is known. It is required to find the width x, Fig. 2, of the gage needed for checking the segment. The gage width x is actually the chordal width of the circular ring segment across the outside corners.

A diagram for the solution of this problem is shown in Fig. 3. One-half of the width of the parting tool ($a \div 2$) is shown (greatly exaggerated) and also one-half the chordal width across the outside corners of the segment ($x \div 2$). Here, again, angle M is the angle between the radial center line of the segment and the radial center line of the cut. Angle N lies between the radial center line of the cut and a radial line drawn to the outside corner of the segment. As may be seen, the parting line of the cut is not radial, since it is parallel with the center line of the parting tool. Angle P lies between the radial center line of the segment and the radial line drawn to the outside corner of the segment.

It will be seen that, if radius r and chordal width of cut a are known, then, in the right-angle triangle of which r is the hypotenuse and $a \div 2$ is one side, the angle N can be found. With angles

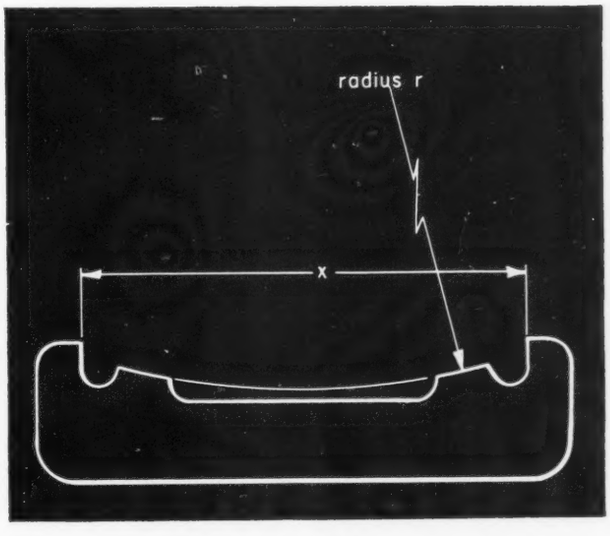


Fig. 2. Gaging dimension (x) is required for the circular ring segment shown in Fig. 1

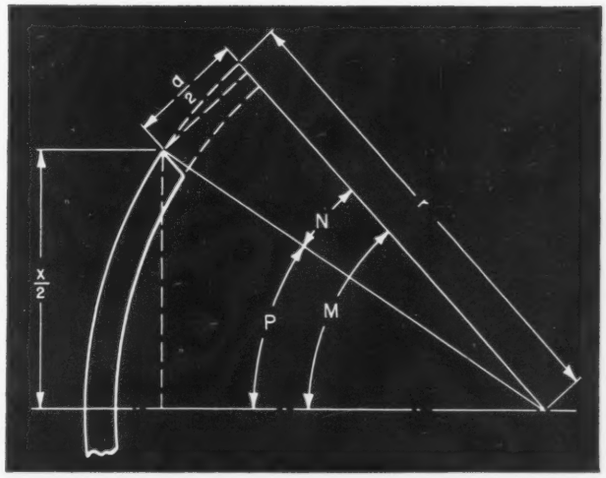


Fig. 3. Diagram for finding gaging dimension (x). Angle (M), radius (r), and one-half width of parting tool are known

M and N known, angle P can be found. Then, in the right-angle triangle of which r is the hypotenuse and P is an angle, side $x \div 2$ can be found thus:

$$\text{Sin } N = \frac{a \div 2}{r} = \frac{a}{2r} \qquad (1)$$

$$P = M - N \qquad (2)$$

$$\frac{x}{2} = r \sin P \qquad (3)$$

Example—Find the gage width x for checking a circular ring segment having an outside radius r of 6.000 inches; the width a of the parting tool is 1/16 inch, and the angle M between the center

line of the parting tool and the center line of the segment is 15 degrees 30 minutes.

Solution

$$\text{Sin } N = \frac{1/32}{6} = \frac{1}{192} = 0.0052 \qquad (1)$$

$$N = 18 \text{ minutes}$$

$$P = 15 \text{ degrees } 30 \text{ minutes} - 18 \text{ minutes} = 15 \text{ degrees } 12 \text{ minutes} \qquad (2)$$

$$\frac{x}{2} = 6.000 \times \sin 15 \text{ degrees } 12 \text{ minutes} \qquad (3)$$

$$\frac{x}{2} = 6.000 \times 0.26219$$

$$\frac{x}{2} = 1.5731$$

$$x = 3.146 \text{ inches}$$

* * *

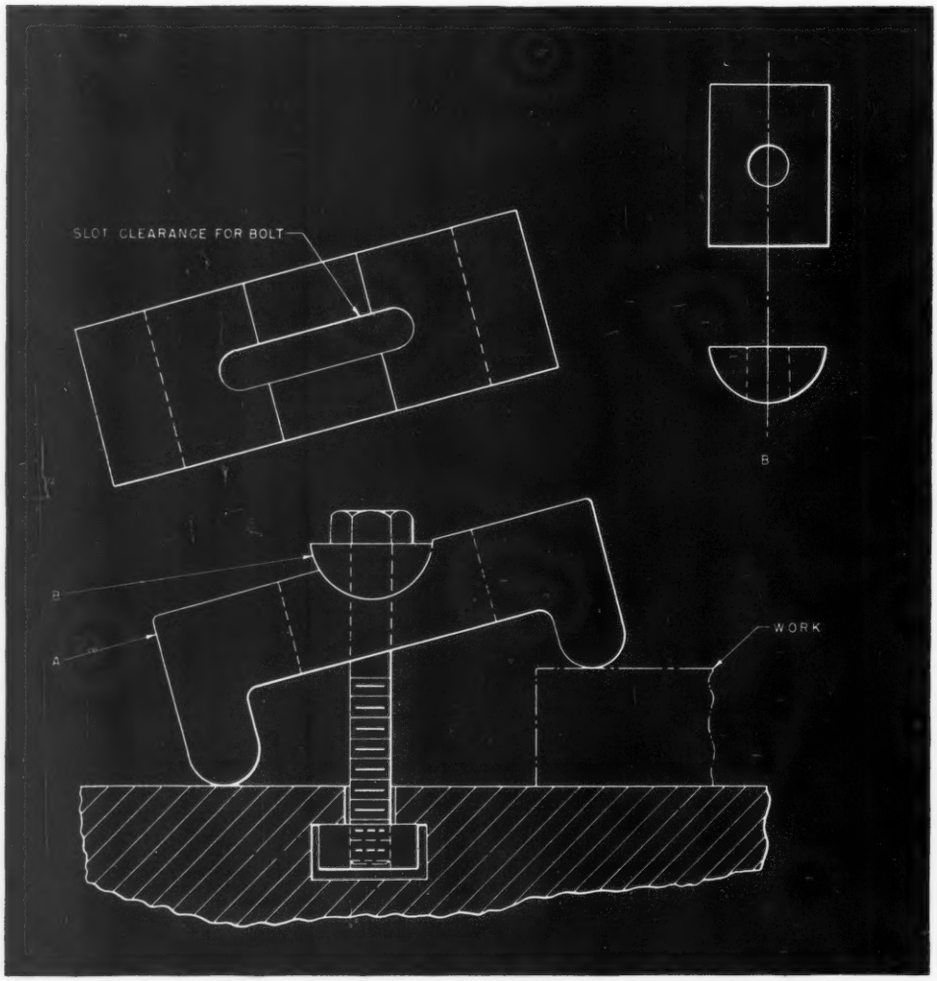
There are 6230 cities and towns with a population above 1000 that are entirely dependent on buses and automobiles for transportation.

Rocker Clamp for Holding Work of Irregular Shape

By ROGER ISETTS

The clamp *A* shown in the accompanying illustration is useful for holding work or fixtures to a machine table. The design is such as to eliminate the necessity of using spacers or of having a wide variety of different size clamps for each job. This clamp can be employed for securing pieces of irregular shape or work that is not parallel with the machine table.

The clamp is made from machine steel and milled to a U-shape as shown. Each leg is rounded at the bottom and one is shorter than the other. A half-moon groove is machined in the top of the clamp and a bolt clearance slot is milled perpendicular to the groove. A rocker *B*, made of cold-rolled steel, is machined to fit the groove in clamp *A*. In the center of the rocker, a hole is drilled to permit the clamping bolt to pass through. For maximum clamping force, it is best not to use the clamp at an angle greater than 45 degrees.



Pieces of irregular shape and work of different sizes are securely held with a clamp of the design shown

Tool Engineering Ideas

Tools and Fixtures of Unusual Design, and Time- and Labor-Saving Methods that Have been Found Useful by Men Engaged in Tool Design and Shop Work

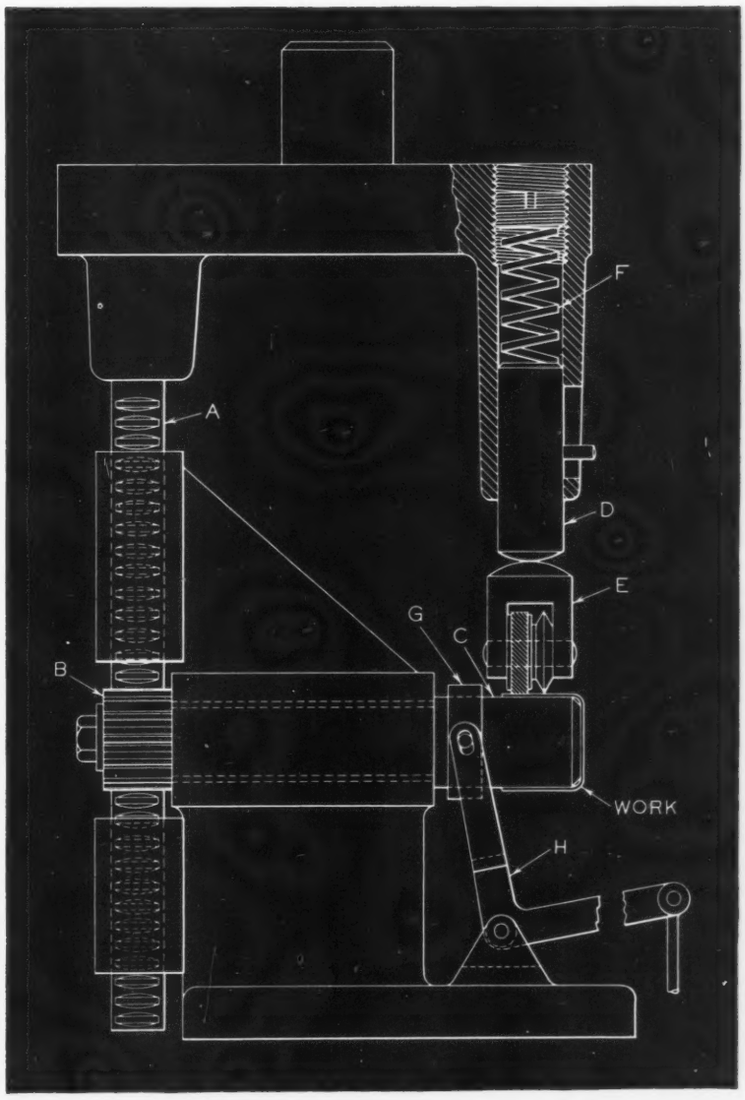
Horn Die for Trimming, Knurling, and Grooving Drawn Parts

By EDWIN MOSTHAF, Industrial Consultant
Huntington, W. Va.

Punch press shops are often confronted with the problem of knurling, grooving, or trimming drawn metal cups or similar parts when lathes and other means of rotating the work are not available. In such cases, the work can be performed on an ordinary punch press equipped with a horn type die such as shown in the illustration.

The rack *A*, attached to the upper member of the die, actuates a pinion *B* on the down stroke of the press. The pinion is connected to an arbor *C*, which rotates the work when the press ram moves downward. A plunger *D*, also attached to the upper member, contacts a knurling or other tool holder *E*. The tool-holder is hinged to a support, not shown, and is normally held away from the work by spring pressure. The spring *F*, acting on the plunger, applies pressure to the work for any depth of knurl or groove required.

An ejector collar *G* is mounted on work-arbor *C* for quick removal of work. Collar *G* is actuated by a bell-crank *H* connected to a foot-lever. When the work has a tendency to slip, instead of rotating with the arbor, an expanding arbor can be used. Cups having a wall thickness of only 1/32 inch have been trimmed quickly and efficiently with this type of die.



Horn die with rotating arbor designed for performing knurling, grooving, and trimming operations on drawn metal cups

Calculating Compound Angles for Grinding Single-Point Tools

By HENRY F. SWENSON, President
J & S Tool Co., Inc., East Orange, N. J.

In shop work, it is often necessary to machine tools or parts having compound angles. This presents problems for the tool engineer, toolmaker, tool inspector, and the machine set-up man. A simple method of calculating the angles to which a tool must be set for producing the

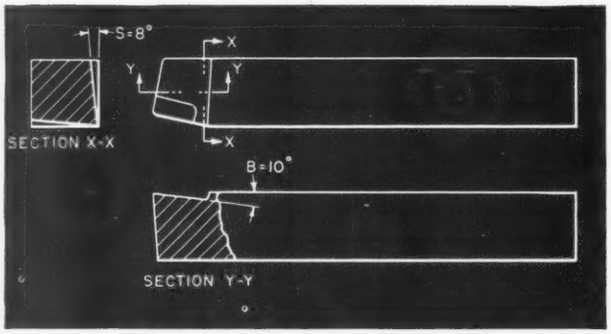


Fig. 1. Single-point cutting tool which necessitates setting adjustable vise to compound angles for grinding the side and back rake angles

required rake angles will be explained in the following.

As an example, consider the turning tool shown in Fig. 1, on which it is required to grind a back rake B of 10 degrees and a side rake S of 8 degrees. The problem confronting the toolmaker is how to set up the tool to grind the top or face to the correct compound angle without losing a lot of time on trial-and-error set-ups.

Let us assume that the tool is held in an adjustable vise, such as shown in Fig. 2, on a standard surface grinder. When this set-up is correct, it will only be necessary to take a grinding cut across the top face of the tool parallel with the surface of the machine table to obtain the required back and side rake angles. From the illustration it can be seen that the tool shank is tilted and gripped between the vise jaws so that it is inclined relative to the upper surface of the jaws at an angle equal to the desired back rake angle B. For the required 10-degree back rake, this angle should, of course, be 10 degrees.

Next it is necessary to determine at what angle X the vise should be tilted relative to the table surface in order that the side rake S will be correct after grinding is completed. This angle can be found by the following formula:

$$\text{Tan } X = \tan S \cos B$$

Substituting the known values of the angles, we have:

$$\text{Tan } X = \text{tan 8 degrees cos 10 degrees} = 0.14054 \times 0.98481 = 0.13841$$

Therefore, $X = 7$ degrees 53 minutes (to the nearest minute).

In working out this formula, the tangent of the side rake angle and the cosine of the back rake angle are found in trigonometric tables. These two figures are then multiplied together, and the result is the tangent of angle X to which the vise must be tilted. The angle corresponding to this tangent is found by again referring to the trigonometric tables.

In occasional cases, it may be required to find the side rake angle S when the back rake angle B and the vise angle X are both known; or perhaps the back rake angle B must be determined when the side rake angle S and the vise angle X are known. This may be easily done by using the following "trick" formula:

$$\frac{\tan X}{\tan S \cos B}$$

Place a finger over the trigonometrical function of the angle we wish to find. For example, if angles X and S are known and angle B is to be found, put the finger tip over cos B. That leaves $\frac{\tan X}{\tan S}$ as the only visible part of the formula. This means that $\cos B = \frac{\tan X}{\tan S}$.

Similarly, by putting the finger tip over tan S, we find that $\tan S = \frac{\tan X}{\cos B}$. Also, putting the finger over tan X leaves tan S and cos B visible. This means that tan X = tan S cos B.

When the inspector checks the job after the rake surfaces have been ground, he places the

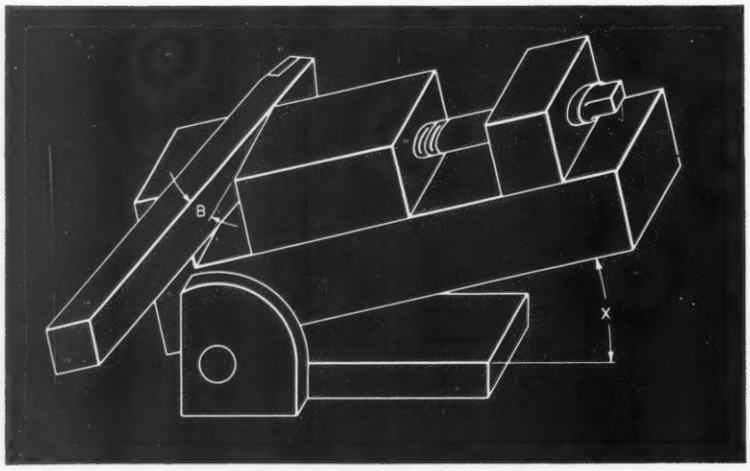
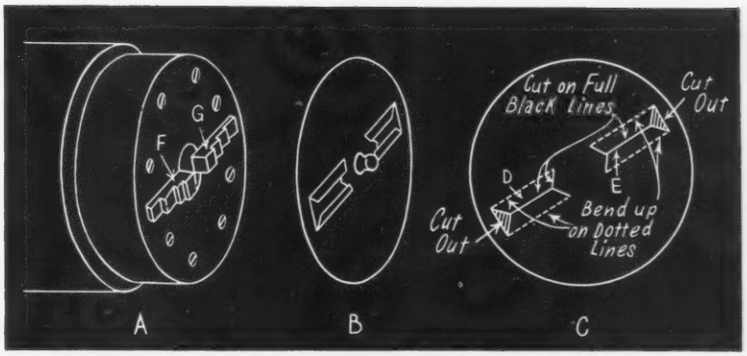


Fig. 2. The single-point cutting tool illustrated in Fig. 1 is here shown in an adjustable vise in position for grinding the back and side rake angles on a surface grinder

tool in an adjustable vise similar to the one the toolmaker used and tests the top surface with a dial indicator on a surface plate. If the indicator reads the same at every point on this surface, the inspector knows, of course, that this surface is parallel with the surface of the table. He then checks the angle *B* of the tool relative to the upper surfaces of the vise jaws and the angle *X* of the vise in relation to the surface of the table either with a protractor or a sine bar. By this method of checking, if any error is found, the inspector can inform the toolmaker exactly where the grinding set-up was wrong.

The procedure as described in the foregoing applies to a simple cutting tool, but the same basic method can be used for solving almost any compound-angle problem.



(A) Chuck with center hole opening; (B) disk-shaped guard with openings for chuck jaws designed to prevent dirt and abrasives from entering center hole of chuck; (C) diagram illustrating method of laying out disk guard for two-jaw chuck

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Slip-On Guard that Protects Chuck when Dressing Grinding Wheels

By LOUIS E. LEBOVITZ, New York, N. Y.

In dressing the abrasive wheel of a precision grinding machine, it is essential that grit or fine particles removed from the wheel be prevented from entering the mechanism and locating surfaces of the work-holding chuck. A simple, easily made guard, which the writer devised and used on the drill chuck of an Oliver drill pointer when dressing the grinding wheel, is shown diagrammatically at *B* in the illustration. Guards of similar design can also be made to fit three- or four-jaw chucks of other machines.

The guard can be made from sheet metal or even heavy, hard-surfaced cardboard. Plastic materials might well be employed for guards of this type by machine builders who desire to provide their products with such equipment.

In making a single guard like the one used by the writer, a disk of the same over-all diameter as the face of the chuck is first cut out of sheet metal or heavy cardboard. The next step is to make the lay-outs for the openings at *D* and *E*, view *C*. These openings should be so dimensioned and positioned that when the shaded triangular sections are cut out and the material cut as indicated by the full lines and bent up along the dotted lines, the openings at *D* and *E* will fit over the jaws *F* and *G* shown in view *A*. The guard disk can then be easily pushed into contact with the face of the chuck.

The length, width, and position of the openings in the disk should be such that the guard will fit closely around the chuck jaws, the bent-up sections gripping the sides of the jaws with sufficient pressure to hold the guard securely in place. The openings should also be positioned to fit the jaws when the latter members have been opened to their maximum capacity. When laid out in this manner, the material in the guard between the two jaw openings will adequately cover the center hole in the chuck and thus prevent the entrance of harmful grit.

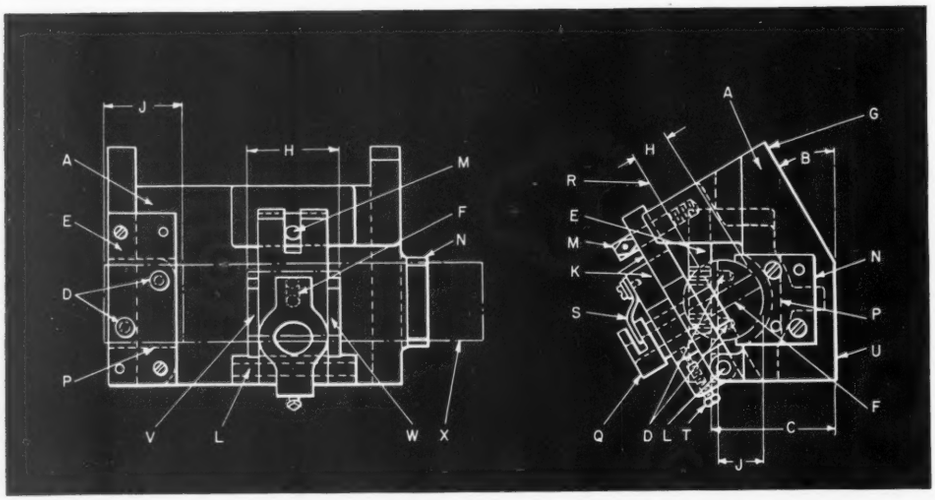
Jig for Drilling a Round Bar at Two Angles

By FRANK HARTLEY

The jig shown in the accompanying illustration (see next page) is used to produce two holes *D*, which are drilled with the jig resting on surface *U*, and one hole *F*, which is drilled with the jig resting on surface *G*. Surface *G* is machined at an angle *B* relative to surface *U*.

The work *X* is a cylindrical bar with a flat across the center at *H* and another at its left end at *J*. Drilling of the holes *D* is accomplished through bushings held in plate *E*. The bar is slipped into place beneath this plate from the right-hand end of the jig while the hinged cover *K* is swung out of the way. The cover pivots about hinge-pin *L* as a center after it is released by turning screw *M* a quarter-turn from the position shown.

With the jig thus opened, bar *X* is cradled in the curved block *N* at the right end and in the curved block *P* at the left. After swinging the cover back into the position shown, it is locked in place by screw *M*, and in so doing the work is brought into line with the end of drill guide bushing *Q* which contacts the flat surface indi-



Drill jig that permits drilling holes in a round bar at two angles

cated at *R* on the work. There is a flat spring at *S* that exerts pressure against the bushing and thereby prevents the bar from rotating. Screw *T*, in conjunction with a binding shoe, is tightened against the side of the bushing to secure it so that it cannot revolve with the drill. The work is located lengthwise by plates *V* and *W* on the hinged cover which engage the sides of the flat surface at *H* on the bar.

With the work properly located in the manner described, the three holes are drilled in the required positions.

A Homemade Ellipsograph

By HENRY R. BOWMAN, Baltimore, Md.

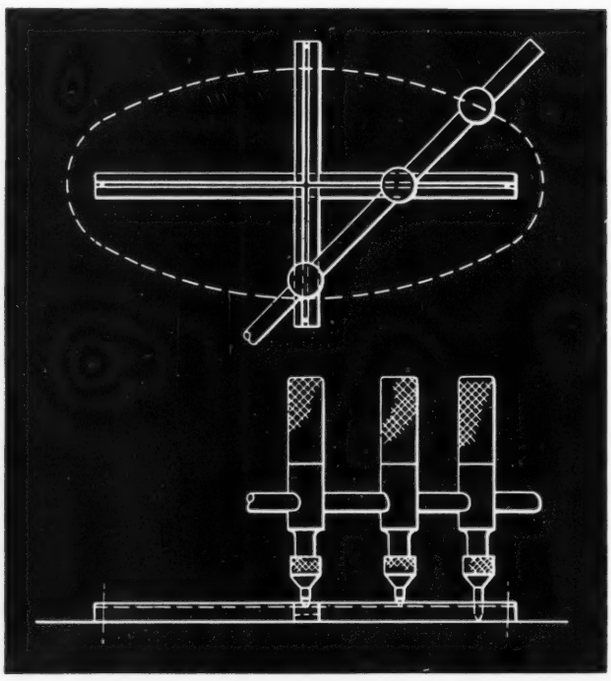
A beam compass, or trammel, having an extra point-holder (which is often furnished), can easily be converted into an ellipsograph. By making a cross of hard wood or metal, as shown in the illustration, and cutting two grooves at right angles to each other in the arms of the cross, a guide track for the needle points will be formed. Small holes are drilled at the ends of the arms for locating pins.

In constructing the ellipsograph illustrated, 1/8- by 1/4-inch stainless steel was used for the cross. The grooves were milled 3/64 inch wide by 1/16 inch deep to accommodate needles 1/32 inch in diameter by 3/64 inch long. This provided a rigid construction, allowing the weight to be distributed between the end needle and the pen or pencil point. In using the ellipsograph, the second needle should be set to provide shoulder clearance.

Ellipsograph made by utilizing a standard beam compass, or trammel, and constructing a stainless-steel cross in which the needle points are guided

Lincoln Electric Co. Establishes Factory Parts Exchange Plan

In order to have factory-built stators, armatures, and other welder parts available all over the country for repair service at the lowest possible cost, the Lincoln Electric Co., Cleveland, Ohio, has established a welder parts exchange plan. By this plan, old parts may be traded in for factory-wound stators, armatures, and certain control parts, the prices for which include trade-in allowances, thus reducing the cost of these parts below that of individual local rewinding and repairing. This service is available through the 146 field service shops of the company. Further information is given in a pamphlet entitled "Lincoln Electric Service Directory," obtainable from the company.



Questions and Answers

A Department in which the Readers of MACHINERY are Given an Opportunity to Exchange Information on Questions Pertaining to the Machine Industries

Misrepresentation in Advertising

C. W.—We sold machinery to a purchaser who now refuses to pay the bill. He claims that, after the machinery was delivered to him, he read advertising in which we misrepresented the machinery. Can we sue and compel the purchaser to pay us?

Answered by Leo T. Parker, Attorney at Law
Cincinnati, Ohio

Yes. In Dobbin vs. Pacific Coast Coal Co. [170 Pac. (2d) 642], it was shown that a purchaser sued both a dealer and a manufacturer for damages. The purchaser proved that it was necessary to remove machinery that had been bought from the dealer and install some other equipment. He also proved that the dealer distributed circulars that misrepresented the machinery.

The higher Court refused to hold the seller liable because the purchaser failed to prove that he had read the circulars before he purchased the machinery. The Court said: "There is no evidence whatever that the plaintiff (purchaser) saw the circular until long after he had purchased the machinery. It is therefore obvious that no finding of fraud could be predicated on any representation even if the circulars were false."

Repairing High-Speed Steel Tools by Welding

N. M.—Having a large number of damaged and broken milling cutters, end cutting tools, special reamers, etc., on hand, various repair methods are being considered in order to save them from being discarded. The majority of these tools are of high-speed steel and are broken at the cutting edges. We would appreciate any suggestions concerning welding methods that can be employed to salvage these tools.

A.—In the repair of high-speed steel tools by welding, protection must be given the steel against harmful absorption of oxygen. If the original high cutting ability of the tool is to be maintained, the composition of the steel after welding must be unaltered. The atomic hydrogen welding process, using filler rods of the same material as the cutters, is therefore recommended for this job. With this method, an alternating-current arc is maintained between two tungsten electrodes in an atmosphere of hydrogen. The process combines some of the flexibility of gas welding with the concentrated heat zone of the metal- or carbon-arc methods.

After annealing at approximately 1300 degrees F. to prevent breakage as a result of stresses incurred by concentrated welding heat, the cutters can be welded while at a red-hot preheat. Of course, great care must be exercised to obtain sound, continuous joints, particularly where the joints are in the vicinity of teeth. Stress-relieving should be performed at the same annealing temperature (1300 degrees F.) after welding to eliminate stresses that might have been set up at the point of welding. Slow, even cooling is essential to avoid stresses created by irregular cooling. The tools must remain in a machinable condition, so that new cutting edges can be established.

When the tools are completely cool, the welded portion may be ground or, if necessary, the entire cutter may be refinished. Refinishing is nearly always necessary when the tool has been warped during welding.

The tools can be hardened in the same way as when new, although carbon may have to be added to compensate for possible loss during heating.

Removing Oil Stains from Aluminum

H. W.—How can oil stains produced by heat-treating be removed from aluminum?

Answered by Reynolds Metals Co., Louisville, Ky.

Oil stains can be removed from aluminum by immersing the work in a cold solution of one part of hydrofluoric acid and four parts of nitric acid to ninety-five parts of water. Following the immersion, the work should be rinsed in clear water and then immersed in 20 to 50 per cent nitric acid. Finally, it should be rinsed in water again and dried.

Simple Fixtures for Assembling Anti-Friction Bearings

By W. F. SORENSON
Chief Metallurgist
Yale & Towne Mfg. Co.

TWO types of anti-friction bearings, both 16 inches in diameter, are employed in the steering turntables of "Worksaver" electric trucks made by the Yale & Towne Mfg. Co., Philadelphia, Pa. One bearing contains 105 balls, while the other has 52 balls and 52 non-ferrous spacers. Simple fixtures such as shown in the accompanying illustrations have greatly facilitated the assembly of such bearings.

Preparatory to assembling, the outer races for the anti-friction bearings are expanded by heating to a temperature of 400 degrees F. in the oil bath seen at the right in Fig. 1. Automatic controls are provided to maintain the bath at the desired temperature. The expanded outer race is then placed on the assembling fixture, and the correct number of balls is dropped on the conical surface in the center.

The balls roll or are pushed into their proper places around the bore of the outer race, after which the inner race is placed on the conical surface, so that it can be pressed into place by hand. As this is being done, the conical ball-positioning portion of the fixture is forced downward within the fixture. Handles are then inserted in slots in the periphery of the fixture and the assembled bearing is removed. The conical portion of the fixture is, of course, lifted to its original position for assembling. When the outer race has cooled and contracted, the bearing will not come apart.

On the other type bearing, where the balls are separated by spacers, a special inner loading race with an integral funnel is employed for assembling, as seen in Fig. 2. The heated outer race is placed on the fixture, and the special inner loading race, provided with handles and a loading funnel, is inserted and locked in place. The required number of balls and spacers are placed alternately in a loading tube, and the tube is inserted in the funnel on the special inner race. A pin in the lower end of the tube is released to permit the balls and spacers to drop progressively into the desired positions between the outer and loading races. When the tube is empty,

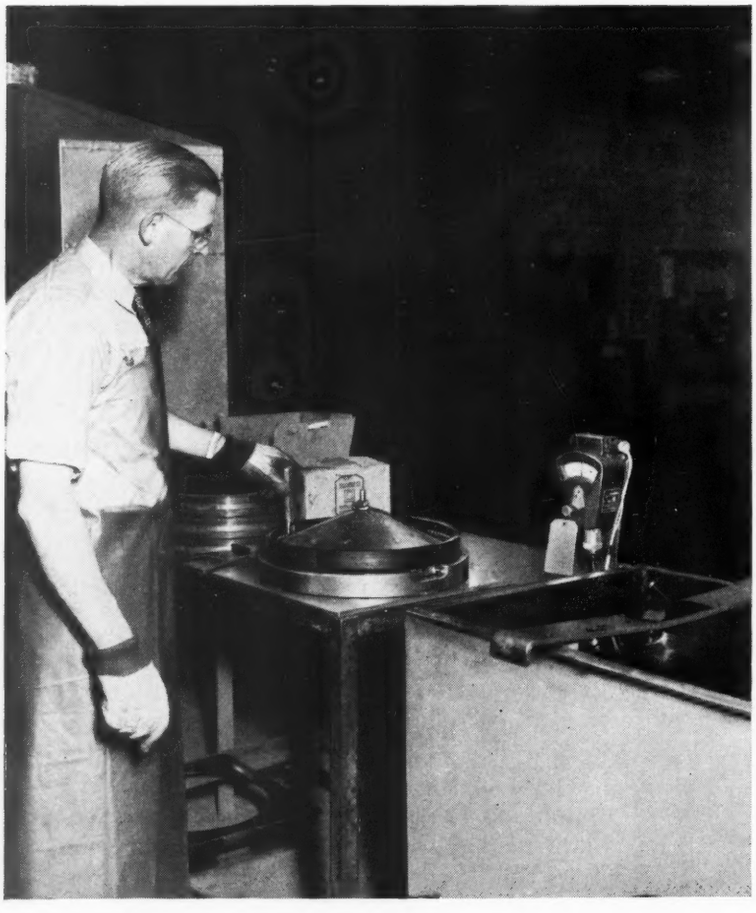


Fig. 1. Assembling ball bearings by the use of a simple fixture. The outer race of the bearing is expanded by heating, the balls are then dropped on the conical surface of the fixture and roll into position in the race, after which the inner race is assembled



Fig. 2. A special inner loading race and a feeding tube, loaded alternately with balls and spacers, are employed to assemble bearings of the spacer type

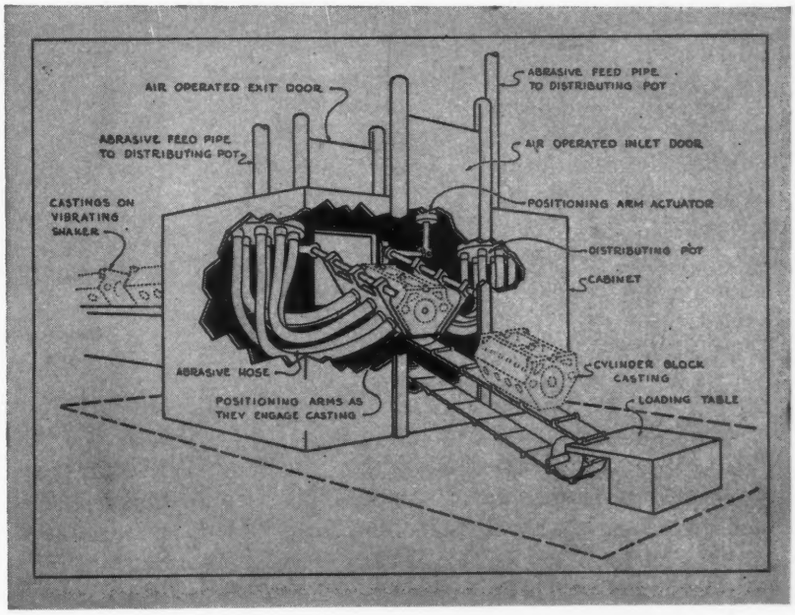
the loading race is removed and the conventional inner race installed. The assembled bearing is then removed from the fixture, the outer race is allowed to cool and contract, and the bearing is ready for installation.

* * *

Cylinder Blocks Cleaned Internally by Shot-Blasting

Automobile engine trouble due to inadequate cleaning of cylinder blocks is said to have been eliminated at the Ford Motor Co. by the application of shot-blasting for internal cleaning. A pressure-blast machine supplements conventional equipment used to remove burnt core and molding sand and scale.

Motor blocks are brought one at a time by conveyor to the shot blast cabinet. Two work-positioning arms, one for each side of the casting, as illustrated diagrammatically, register the block in the correct position for applying the shot blast. Shot is blasted through sixteen nozzles at an air pressure of 85 pounds per square inch. The surfaces of the water jacket, crevices, and thin sectional openings are blasted clean.



Diagrammatic view of shot-blasting equipment used by the Ford Motor Co. to insure complete cleansing of all internal surfaces of engine cylinder blocks

Westinghouse Productive Power Show

A traveling show to demonstrate how industry can do its work better, faster, and cheaper has been produced by the Westinghouse Electric Corporation, Pittsburgh, Pa., and started its tour in February at Akron, Ohio. This Productive Power Show is being sponsored by public utilities for their customers in 125 cities. The Show begins with a graphic demonstration of the effects of wire size and circuit protection in factory distribution systems. Lighting problems, effects of air pollution on manufacturing processes, use of infra-red heat for drying paint, spot-welding, and furnace brazing are among the subjects covered.

Technical Sessions of American Society of Tool Engineers

DURING the annual meeting of the American Society of Tool Engineers, which will be held April 10 to 14, inclusive, at the Convention Hall and Commercial Museum in Philadelphia, there will be a series of technical sessions on a large variety of subjects pertaining to the working of metals. The papers to be presented are as follows:

Monday, April 10—"Forming Sheet Metal by the Marform Process," by R. B. Schulze, General Supervisor of Manufacturing Research, Glenn L. Martin Co.; "Carbide Die Developments," by G. F. Eglinton, Vice-president, Lincoln Park Industries; and "Cold Extrusion of Metals," by J. Parker Bowden, Heintz Mfg. Co.

Tuesday, April 11—"Design and Use of Die-Casting Dies," by Charles Franklin, Master Mechanic, Rochester Products Division, General Motors Corporation; "Automation of Ground and Turned Production Parts," by N. L. Bean, Chief Design Engineer, Automatic Transmission Program, Ford Motor Co.; "Machining and Fabrication of High-Temperature Alloys," by C. L. Sadon, Manufacturing Engineer, Aircraft Gas Turbine Division, General Electric Co.; "Machinability," by R. T. Hurley, President, Curtiss-Wright Corporation; "Application of Special Drill Units to Standard and Special Machinery," by Eugene Numrich, Application Engineer, Avey Drilling Machine Co.; and "Micro Drilling," by J. A. Cupler, II, General Manager, National Jet Co.

Wednesday, April 12—"Metamics," by W. O. Sweeny, Jr., Assistant Sales Manager, Haynes Stellite Division, Union Carbide and Carbon Corporation; "Cold Roll-Forming of Metals," by E. J. Vanderploeg, Development Engineer, Yoder Co.; "Automation in Forging and Heat-Treating," by an engineer from the Oldsmobile Division, General Motors Corporation; "Automation in the Press Room," by Herman Zorn, President, V & O Press Co.; "Tooling up for Modern Truck Engine Production," by Joseph Olender, Mechanical Engineer, International Harvester Co.; and "Use of Element Time Data for Effective Tool Design," by N. M. Perris and H. K. Keever, Partners, Stevenson, Jordan & Harrison, Inc.

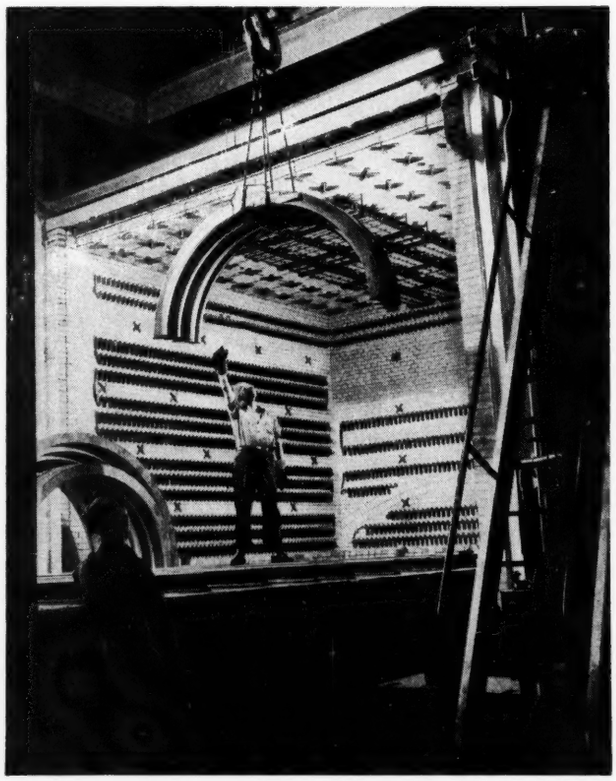
Thursday, April 13—"Nitriding of High-Speed Steel Tools and Gages," by J. G. Morrison, Chief Metallurgist, Landis Machine Co.; "Hard Chrome-Plating," by B. A. Taylor, Vice-president, Chrome Electro-Forming Co.; "Broaching Applications for Cost Reduction," by O. W. Bonnafe, Chief Research Engineer, LaPointe Machine Tool Co.; and "Automation in Hopper Feeds for Assemblies," by C. E. Kraus, President, Kraus Design, Inc.

Friday, April 14—"Design Economics," by John VanHamersveld, Supervisor, Design Cost Control Group, Glenn L. Martin Co.; "Investment Casting," by T. F. Frangos, Sales Engineer, Haynes Stellite Division, Union Carbide and Carbon Corporation; and "Effect of Latest American Standards on Spindle Deflections," by Dr. Max Kronenberg, Consulting Engineer.

* * *

Casting "Cooker" Installed in New Turbine Plant

Castings from 45 pounds to 45 tons in weight can be handled by a "bulkhead" type of electric annealing oven now in operation in the new turbine manufacturing building at the Schenectady Works of the General Electric Co. The normal operating temperature of this furnace is about 700 degrees C. (1292 degrees F). The maximum temperature is 1200 degrees C. (2192 degrees F). This car type furnace is 16 feet in length and operates on approximately 1400 volts.



Hoisting a large casting into electric annealing oven in the new General Electric turbine plant

THE SALES ENGINEER AND HIS PROBLEMS

By BERNARD LESTER
Lester, Hankins & Silver
Sales Management Engineers
New York and Philadelphia

Selling Expense is a Real Element of Costs

"It's perfectly terrible," exclaimed an elderly lady (a neighbor of ours with a socialistic leaning), "that I have to pay more than four times what it costs to make a new refrigerator!"

Most everyone has a distorted conception of costs. The man in the street looking at a machine tool thinks of the cost in terms of material and labor. He doesn't visualize such important cost elements as design, capital investment with its risks and interest return, shrinking values due to obsolescence and replacement, and selling costs.

Costs build up as the product passes through the various stages of design, manufacture, assembly, testing, and packing. On the shipping platform, a product is worthless in a true sense, although it has potential value. Values become real only when a machine is put successfully to work. Selling the machine and putting it to profitable work is the climax that converts potential value into real value. Selling is a cost—and a very real cost too—but one that transforms all potential values into real values. Selling includes many items of cost, and one of the greatest of these is work that is done on the lost or abandoned order.

"You get a handsome profit—a good discount," says the crafty buyer to the machinery salesman; "just give me a cut—a discount—a slice of your profit. You can afford it if I give you the order."

What a misconception—what a lack of understanding! Selling costs are just as real as material and labor costs. There should be no such words as "gross profit" or "net profit." There is only a profit when all costs are deducted from money actually and finally paid.

How can the salesman help clear up this misconception? Here are some suggestions:

1. Don't assume the defensive. Come right out with the fact that you, a machinery salesman, are the one who transforms potential value into real value. "My time, my ideas, and my work can make money for you, but these, in turn, cost real money. Yet they are more than worth it to you, Mr. Prospect."

2. Emphasize the fact that wise and efficient selling reduces the cost of buying. It enables the purchaser to buy better machines more cheaply. You, doing a complete selling job, help keep your prospect's buying costs down.

3. Ask the prospect: "Does it cost you anything to buy materials and equipment?" Of course it does—he can't dodge that. If it costs to buy, it also costs to sell. Most forms of selling cost much more than buying.

4. Point to some instances where machines that were bought and improperly applied were a loss to the buyer, and others where properly sold machines, through skilled application, made big money returns. Dramatize the contrast—the results.

5. Sell the value of skilled selling to your own management. Many heads of machine-building concerns think only in terms of equipment, manufacturing methods, and the financial statement. Sales costs are often looked upon as an unnecessary and nebulous burden.

Any financial statement of a company shows only physical assets and liabilities. The value (or the liability) of a sales force and customer good will doesn't appear on the balance sheet. Yet they may be of greater value than all the physical assets.

Hence many managements should be led to take the initiative in all forms of sales promotion, to stress not only the quality of the equipment they produce, but also the quality and skill of their organization in putting their machines to profitable use. This cost element has enormous customer value. It should be more vigorously

sold. You as a salesman can awaken your own management to its reality.

Money, time, thought, skill, and effort in selling are real. Each one of us is learning and can continue to learn how to improve our sales efficiency. But are we selling the idea to the prospect and others that all these efforts are real costs; that these costs transmute all other costs into customer values; that offering real competition is helping the buyer? Preach this gospel. Live it.

* * *

American Standard on Gaging Practices for Ball and Roller Bearings

The American Standards Association announces a new American standard on "Gaging Practices for Ball and Roller Bearings." This is the first of a series being developed by a committee representing fourteen associations of engineers, industrial users, and manufacturers of bearings, as well as the U. S. Army and Navy. Copies of the standard can be obtained at 50 cents each from the American Standards Association, 70 E. 45th St., New York 17, N. Y.

* * *

Number of Apprentices in the Metal-Working Trades

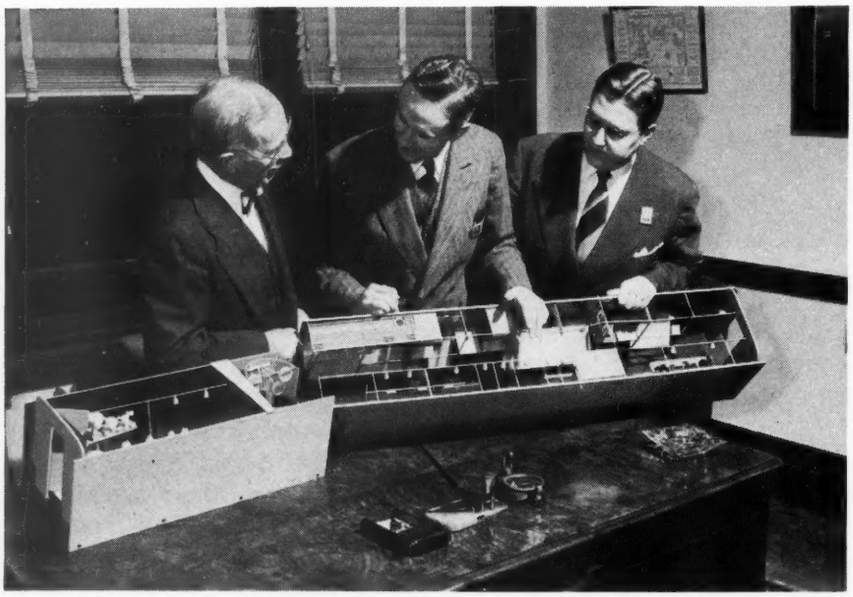
According to the United States Department of Labor, there are at the present time 3071 machinist apprentices and 1843 toolmaker and diesinker apprentices registered with the Bureau of Apprenticeship or with the different state apprenticeship agencies.

General Electric Co. to Launch "More Power to America Special"

Exhibits of more than two thousand electrical products, processes, and techniques, ranging from precise aircraft instruments to complex working models of steel-mill, textile, and other industrial equipment, will be displayed in a nine-car train which will be launched on a nation-wide tour this spring by the Apparatus Department of the General Electric Co. This "More Power to America Special" will visit the country's key industrial centers for inspection by utility and industrial executives and municipal leaders. The exhibits will dramatize the latest apparatus and ideas for producing and using electric power most efficiently.

Included in the exhibits will be turbines of all types—steam, gas, and mercury; equipment for transmitting and distributing electric power; and motors and controls in combinations capable of performing a wide variety of industrial operations. Other displays will include precise measuring and recording instruments, new developments in street lighting and sewage treating equipment, and products that contribute to national security. The train will be hauled by an Alco-G-E two-unit, 4000-H.P. Diesel-electric locomotive which, itself, will comprise one of the displays. Special cars are being built by the Pullman Standard Car Mfg. Co.

Officials of the General Electric Co. look upon this train as the most important single promotional undertaking in the industrial marketing history of the company. The project has been a major activity in the company's Apparatus Advertising and Sales Promotion Divisions under the direction of C. P. Fisher, Jr.



Inspecting a scale model of one of the exhibit cars of General Electric's "More Power to America Special." (Left to Right) C. H. Lang, vice-president in charge of sales, Apparatus Department; C. P. Fisher, Jr., manager of the Apparatus Exhibit Train Division; and J. S. Smith, manager of the Apparatus Department's Advertising and Sales Promotion Divisions

Shop Equipment News

Machine Tools, Unit Mechanisms, Machine Parts, and Material-Handling Appliances Recently Placed on the Market

New Cincinnati "Filmatic" Plain Grinding Machines

Features of special value in grinding medium or large sized parts are incorporated in the new "Filmatic" 14- and 16-inch plain grinding machines, announced by Cincinnati Grinders Incorporated, Cincinnati 9, Ohio. The grinding-wheel spindles of these new machines run on "Filmatic" bearings, which consist of multiple segments, fixed axially but free to rock radially a slight amount. Immediately upon rotation of the spindle, wedge-shaped oil films are formed between the segments and the spindle, which build up to high pressures and automatically adjust themselves to variations in forces created by the grinding action.

Lubrication of the "Filmatic" bearings is automatic, filtered oil being circulated through the system. The lubrication precedes spindle rotation, and initiates the starting of the spindle through a pressure switch. Should the lubricating system fail, the grinding wheel drive motor would automatically stop.

The table is traversed by means of a rack and pinion and a simple drive from the motor. Traverse rates are infinitely variable between 3 and 120 inches per minute through a direct-current motor, controlled electronically from an alternating-current source. This drive is designed to provide smoothness and flexibility of operation comparable to that obtained with hydraulic traversing equipment.

The electrical system for these machines provides automatic acceleration and deceleration of the table at reversal, thereby eliminating shock. In addition, tarry at each end of the table stroke can be independently adjusted for a time delay of from zero to about eighteen seconds. Coolant flow and headstock spindle rotation can be stopped and started independently or in unison with the table traverse. This is also a function of the electrical system. The table ways, table drive parts, and the rack and pinion are also automatically lubricated.

The headstock is a dead-spindle, direct-current motor-driven unit having a No. 13 B & S taper hole in the spindle. The unit has an exceptionally long bearing on the table, equal to almost the entire length of the headstock casting. Spindle speeds are rheostat-controlled and infinitely variable from 40 to 144 R.P.M. for the 14-inch machine, and from 20 to 72 R.P.M. for the 16-inch machine. Matched V-belts and precision silent chain transmit power smoothly from the motor to the faceplate. A simple gravity lubricating system at the front of the headstock, incorporating a reservoir with

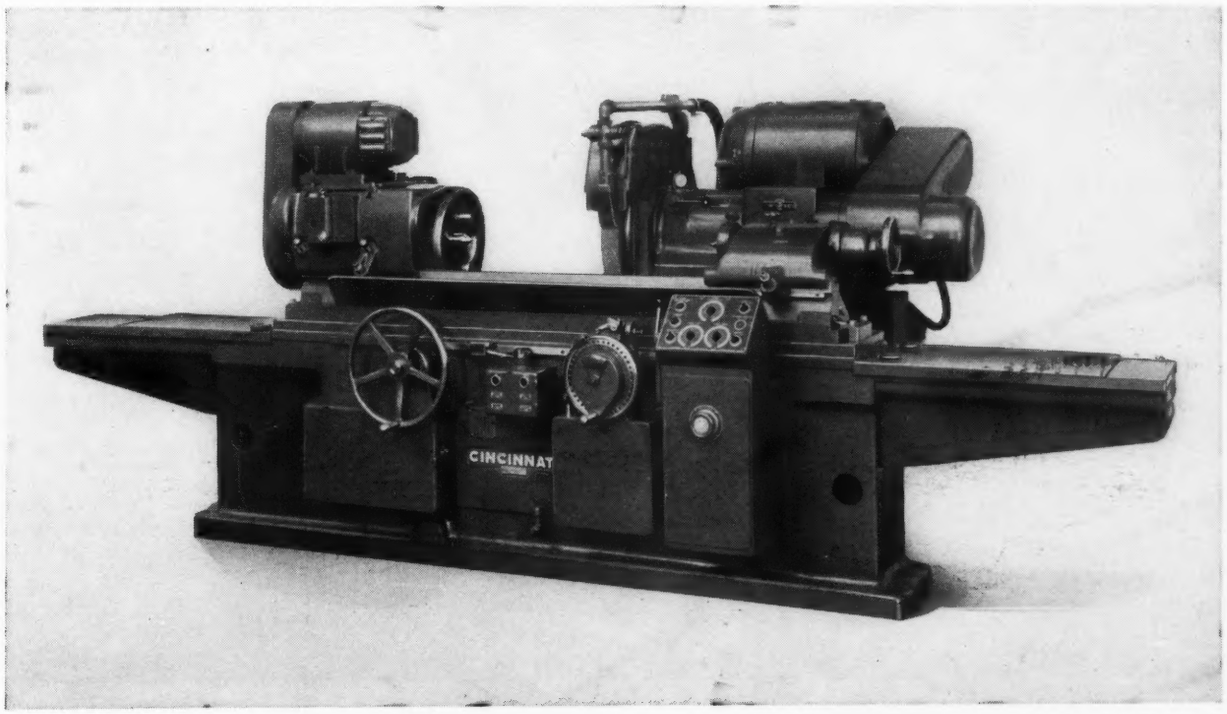


Fig. 1. Cincinnati "Filmatic" 16- by 36-inch plain grinding machine

To obtain additional information on equipment described on this page, see lower part of page 202.

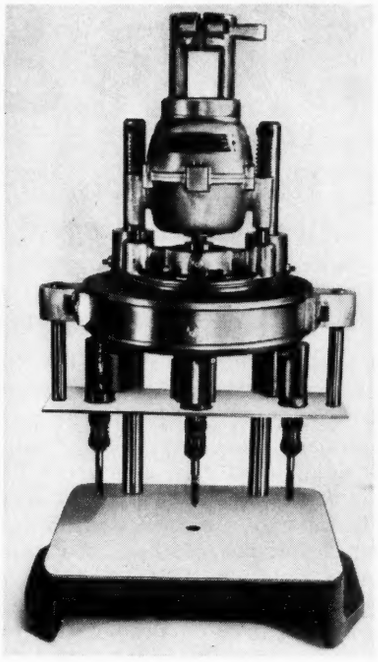
visible level supply and rate of flow, protects the running parts.

The footstock bearing on the table has been made much longer than conventional practice dictates by adding an apron extension at each end of the unit. A bellows type dust guard at the projecting end of the footstock spindle excludes dust and grit. An additional means of retaining accuracy is the sheet-metal telescopic guards at the end of the table, which completely enclose the table ways.

All operating elements are within convenient reach of the operator. Electrical control buttons and rheostats are grouped in a panel near the operator's right hand. A 20-H.P. motor drives the grinding spindle through matched V-belts. The headstock unit of the 14-inch machine is driven by a 1 1/2-H.P. motor, and that of the 16-inch machine by a 2-H.P. motor. A 1-H.P. motor drives the table, and a 1/3-H.P. motor is provided for each of the two lubricating pumps.

Thirty extra pieces of equipment are available for use on these "Filmatic" grinding machines, one of the most outstanding being an automatic wheel-balancing unit. Controlled by a lever reached from the operator's normal working position, the grinding wheel can be balanced in a few seconds without removing the wheel mount from the machine. Hydraulic profile wheel-truing fixtures are available for truing the face and corners of the wheel to a variety of shapes. This equipment has proved especially efficient in grinding the diameters and radii on railroad car axles.

Tinning, strip mill, foil, precious metal, and similar cambered rolls can be ground on these machines when they are equipped with swivel-table type roll-cambering mechanisms. This equipment can be applied to machines having lengths of 36, 48, and 72 inches. Power cross-feed to the wheelhead can be supplied for roll-grinding operations or other work requiring frequent and lengthy cross traverse movements. 61



Ettco-Emrick adjustable-spindle multiple drilling and tapping head

Ettco-Emrick Multiple Drilling or Tapping Head

Flexibility in drilling or tapping parts with hole sizes up to and including 5/16 inch in steel on any type drill press is made possible through the use of the convertible Ettco-Emrick adjustable-spindle multiple head just announced by the Ettco Tool Co., Inc., 594 Johnson Ave., Brooklyn 6, N. Y. Rapid and accurate spin-

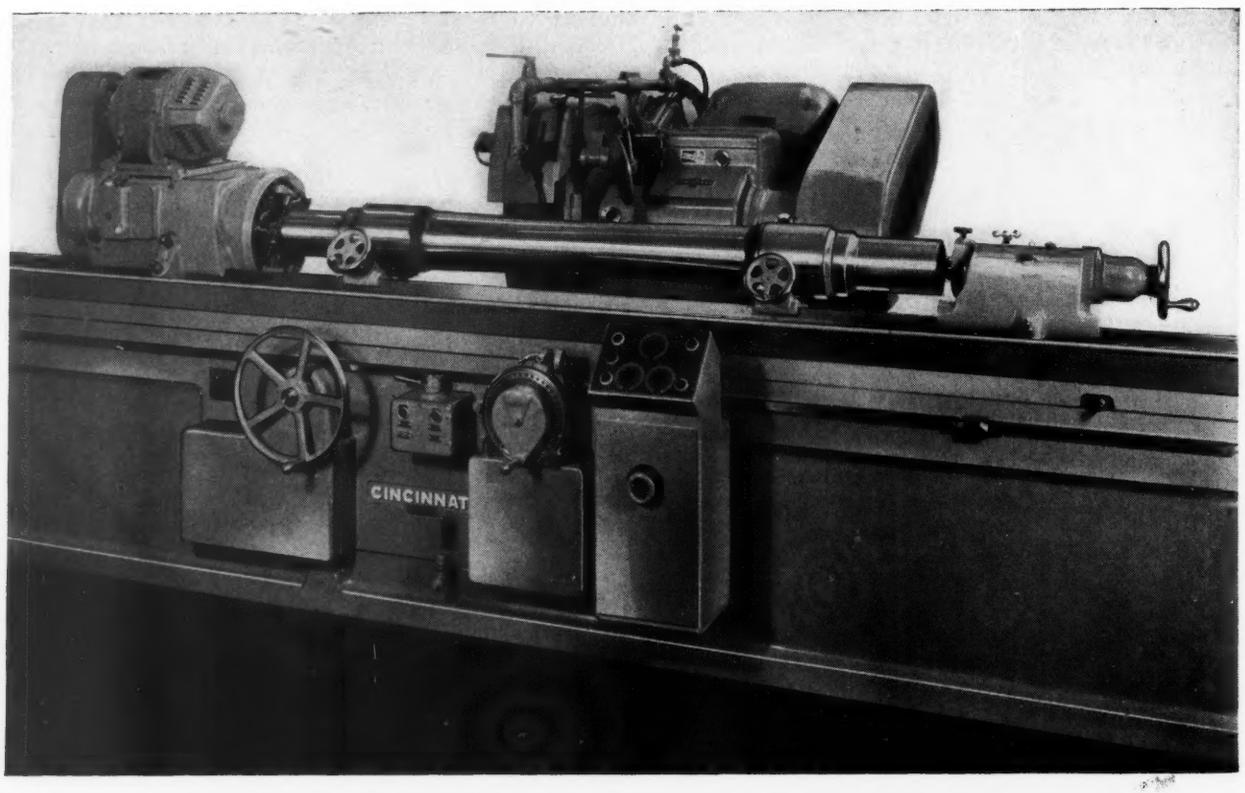


Fig. 2. Cincinnati "Filmatic" 16- by 120-inch plain grinding machine, equipped to grind the diameter and adjacent radii on railroad car axles

To obtain additional information on equipment described on this page, see lower part of page 202.

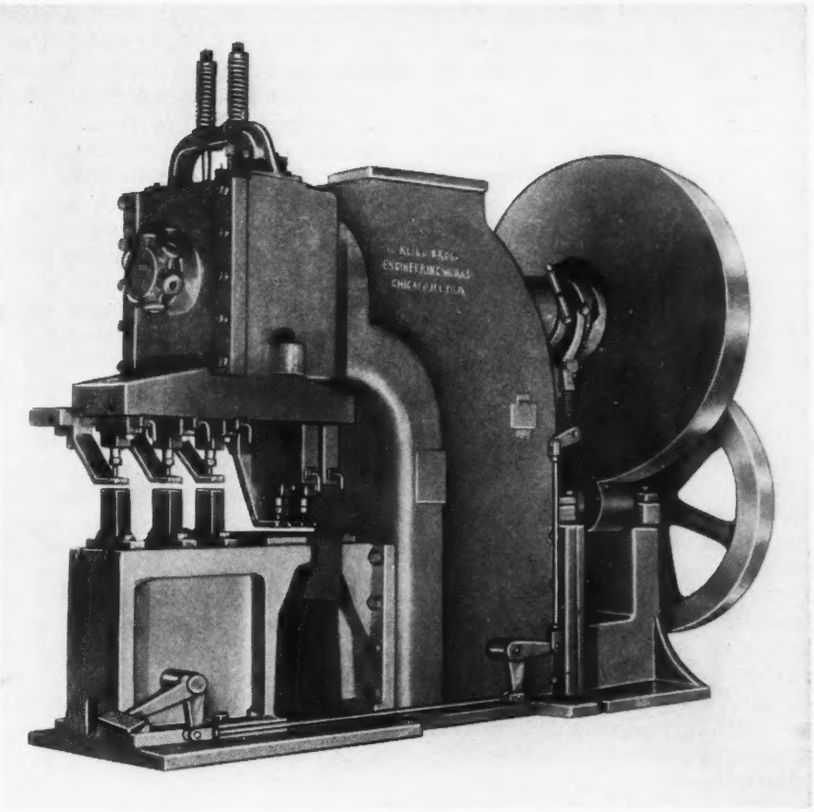
dle adjustments can be made on these new heads for center distances ranging from 1 1/16 to 7 5/8 inches. The spindles can also be located in any desired poposition within a circle 3 5/16 inches in diameter. The templet method used with this head simplifies the accurate location of the spindles for a given hole combination. It also makes it possible to change quickly from one drilling or tapping operation to another.

The bedplate of the new unit serves to maintain accurate alignment of the components in much the same way that punch and die members are kept in alignment by the bolster plate and guide pins. This drilling and tapping head is available with two, three, four, or five spindles. ----------62

Kling Universal Punch for Structural-Steel Work

An improved universal type of punch for use in structural-steel and fabricating shops has been developed by Kling Brothers Engineering Works, 1300 N. Kostner Ave., Chicago 51, Ill. This No. 12 machine has a rated ram pressure of 235 tons, a 2 1/4-inch stroke, and a throat depth of 28 1/2 inches. A 2 1/2-inch hole or its equivalent can be punched through mild steel 1 1/4 inches thick.

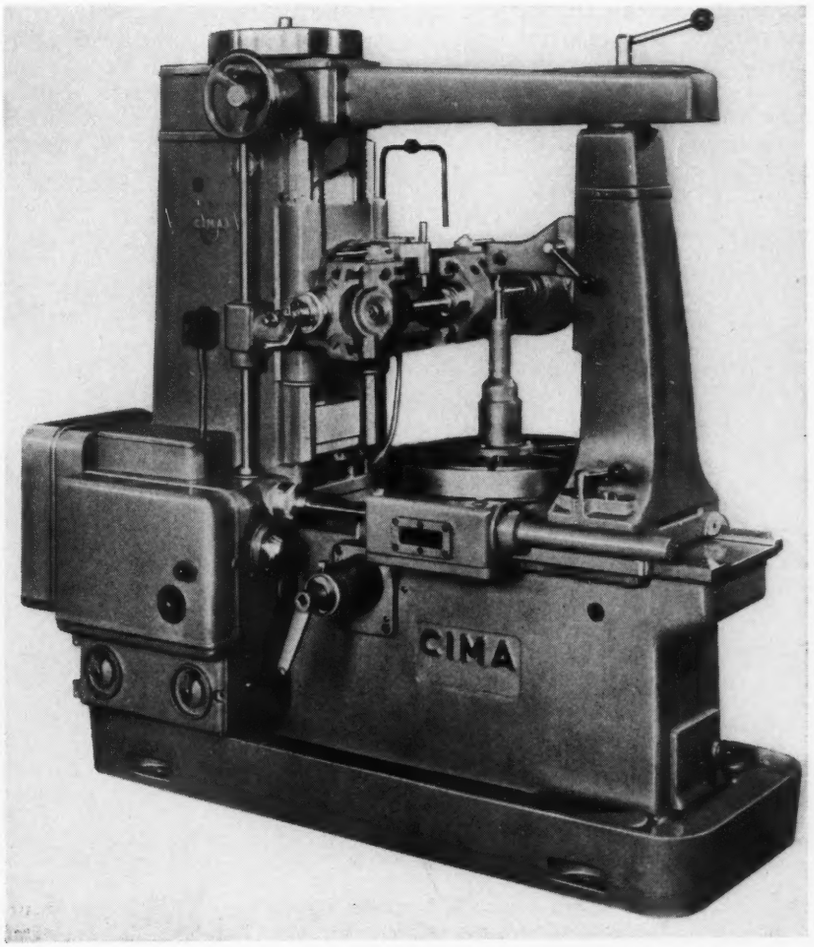
The equipment includes two low die-holders, three high die-holders, and two gooseneck die-holders, with punch-holders to suit. The machine will handle structural beams ranging in size from 3-inch I-beams to 36-inch H-beams, and is capable of handling a wide range of flange and web punching work without the necessity of changing set-ups. ----------63



Universal punch for structural-steel work developed by Kling Brothers Engineering Works

"Cima" Gear-Hobbing Machine

A universal type gear-hobbing machine designed for cutting spur, helical, and worm gears is being introduced in this country by the George Scherr Co., Inc., 202 Lafayette St., New York 12, N. Y. The cutter-head of this machine is provided with a slide which feeds a tapered hob tangentially to the work. This method of generating worm-gears with



"Cima" gear-hobbing machine introduced by the George Scherr Co., Inc.

To obtain additional information on equipment described on this page, see lower part of page 202.

multiple threads produces teeth having smooth, accurately finished sides. The machine also has the advantage that simple, easily made fly cutters can be used for generating accurate worm-gears when no hob is available or when the quantity of work required does not justify the making of a special hob. 64

G-E Engine-Driven Direct-Current Arc-Welders

A new line of light-weight, mobile, engine-driven, direct-current arc-welders has been brought out by the General Electric Co., Schenectady 5, N. Y. One of the five machines in this WD-40 series consists of a general-purpose, heavy-duty welder, driven by a 31-H.P. Wisconsin air-cooled engine with magneto ignition. The welder weighs 1050 pounds, and its rated output is 200 amperes at 40 volts. A manually operated slow-down control is employed to economize on fuel by slowing the engine to idling speed when not holding a welding arc. This machine is designed for welding jobs requiring a heavier duty cycle and a good degree of portability, such as required for pipe-line operations. It is also available with a four-cylinder, liquid-cooled Hercules engine drive.

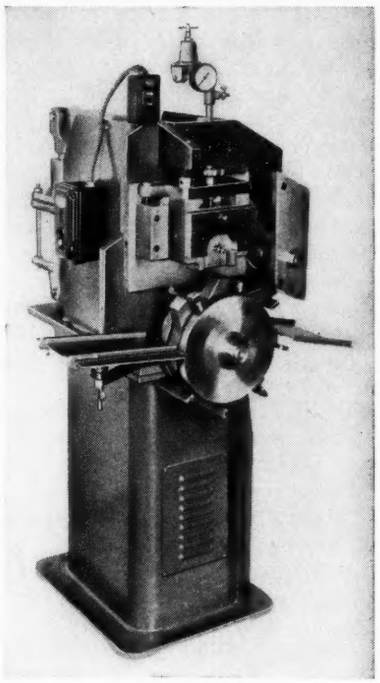
Another machine in the line is a liquid-cooled gasoline-engine-driven welder powered by a six-cylinder 63-H.P. Chrysler industrial engine. This welder has a rating of 300 amperes at 40 volts and weighs 1725 pounds. It is adapted for use in construction work for welding beams and girders. A 400-ampere model, weighing 1775 pounds, with a welding range of 80 to 500 amperes is also available.

The series also includes four welders in the Diesel-drive line, including two 300-ampere and two 400-ampere models. All Diesel engines are equipped with batteries, generators, electric starters, and preheaters to facilitate operation in sub-normal temperatures. 65

"Post-Master" Steel Drafting Table

The Stacor Equipment Corporation, 1887 Atlantic Ave., Brooklyn 33, N. Y., has recently placed on the market a low-priced, steel four-post drafting table. With the exception of the kiln-dried wood top and the "Duron" dust cover, the unit is constructed entirely of heavy-gage steel, assuring unusual strength.

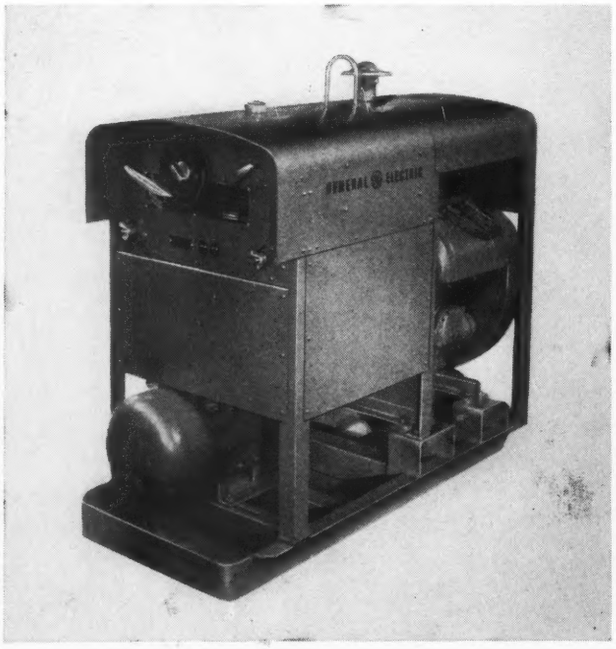
The wood top of the table is adjustable. The unit can be obtained with or without drawers, and is available in three sizes, with boards 36 by 60, 36 by 72, and 42 by 72 inches. 66



Noble & Westbrook machine for marking cylindrical parts

Noble & Westbrook Marking Machine

The Noble & Westbrook Mfg. Co., East Hartford 8, Conn., has developed a new machine for the heavy-duty marking of cylindrical parts, such as studs, rods, and bushings. This machine — the Model 302—is constructed with a horizontal main spindle on which



G-E portable, engine-driven, 200-ampere 40-volt, direct-current arc-welder



"Post-Master" drafting table brought out by Stacor Equipment Corporation

To obtain additional information on equipment described on this page, see lower part of page 202.

a vertical carrier dial is placed. The motor-driven main spindle rotates the work-carrier and back-up pressure dials continuously.

In operation, the rotating carrier dial picks up the individual work-pieces from a gravity feed and carries them along to the marking station, where they are marked and then automatically unloaded. The machine is equipped with a floating die-holder, mounted on a rigid shaft that is located in an off-center position at the right of the machine. This die-holder operates against a mill type air cylinder, which acts as a cushion to compensate for variations in the diameter of the pieces being marked. The air pressure controls the depth of marking and gives a uniform inscription for the full length of the marking, regardless of minor surface irregularities. The machine is furnished with motor, air cylinder, and controls. ----67

Wickman Bench Type Carbide Tool Grinder

The Wickman Mfg. Co., 15531 Woodrow Wilson Ave., Detroit 3, Mich., has brought out a bench type universal carbide tool grinder designed especially for use with diamond wheels of all types. This machine can be used as a surface grinder, a chip-breaker grinder, and a universal tool and cutter grinder. It is provided with both a swiveling table and a swiveling motor with micro setting scales for accurate grinding and resharpening of cutters, reamers, counterbores, and similar tools. Power is furnished by a special 1-H.P. reversing motor having a high operating speed of 2850 R.P.M., which is said to be free from vibration.

Grinding wheels are mounted directly on the 1 1/4-inch ball-bearing spindle or on either of two adapters which provide spindle extensions of 2 1/8 and 5 3/8 inches. Motor and wheel can be accurately set in any position up to 20 degrees either side of the vertical center position. Lever and handwheels in front of the machine provide vertical, longitudinal, and transverse table movements. Coolant is supplied by a centrifugal type pump. A reservoir with a capacity of 1 1/2 gallons is built into the base.

The grinder is 31 3/4 inches high, requires a floor space 30 by 30 inches, and has a table 17 by 5 inches in size. All sliding surfaces are adequately protected by dust covers. ----68

New Di-Acro Hydra-Power Bender

A Di-Acro Hydra-Power bender of practically universal application has been added to the line of the O'Neil-Irwin Mfg. Co., 332 Eighth Ave., Lake City, Minn. Simple, compound, and reverse bends can be formed with this bender in tubing angle stock, channels, extrusions, moldings, strip stock, bus bars, round or square rods, and other pieces of ductile materials.

A simple, even flow of power is assured by the Vickers hydraulic system incorporated in the machine. The correct bending speed for all types of materials can be obtained through a variable flow control valve, which allows for stepless speed adjustment. Engagement of the control lever starts the bending cycle, leaving the operator's hands free until the bend is completed and the bending motion automatically stopped. A flick of the lever serves to return the machine at high speed to the loading position.

An automatic angle control permits a series of bends of varying degrees to be made progressively in a part without removing it from the machine. Large quantities of identical parts can be



Bench type carbide tool grinder brought out by the Wickman Mfg. Co.



Di-Acro Hydra-Power bender added to the line of O'Neil-Irwin Mfg. Co.

To obtain additional information on equipment described on this page, see lower part of page 202.

accurately duplicated through the use of a multiple-length gage. This machine will also perform compression bending by wrapping the material around a stationary form. An important feature of this universal machine is the provision for performing bending operations in either direction.

The illustration shows the Di-Acro Hydra-Power bender set up for forming tubing, using a toggle clamp and forming roller. A mounting plate and forming nose are also provided. The mounting plate has a radius capacity of 22 inches for bending complete circles. Bending speeds range from 6 to 12 R.P.M.

The machine has a capacity for bending 16-gage steel tubing having an outside diameter of 1 1/4 inches. It will also handle standard iron pipe up to the 1 inch size, round steel bars up to 7/8 inch in diameter, 3/4-inch square steel bars, and angle-bars 1/8 by 1 by 1 inch. Flat steel bars up to 1/4 inch by 4 inches can be bent flatwise, and flat steel bars up to 3/8 by 1 inch can be bent edgewise. The machine is regularly equipped with a 2-H.P. motor, but a larger motor can be used if desired.....69

Warner & Swasey Thread-Cutting Attachment

The Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio, has announced a retractable threading tool-holder for use on the cross-slides of Warner & Swasey turret lathes. This new attachment automatically withdraws the tool from the work at any desired point, permitting cuts to be taken at full speed close to shoulders without the necessity for careful attention by the operator. It has a spring release mechanism that is cocked by a handle to move the tool forward, and released by a positive, adjustable screw-stop attached to the headstock. The stop actuates a cam-rod in the attachment, which snaps the tool back from the work. Positive, clean disengagement of the tool from the work is assured while the spindle is rotating.

The device can be furnished for use at the front of the cross-slide, or with extra linkage for use at the rear of the cross-slide. The retractable tool-holder is used in conjunction with the Warner & Swasey apron-mounted chasing screw attachment, which permits any standard pitch from 4 to 32 to be cut from the square turret. The thread-chasing attachment, which is applicable to all saddle type and Nos. 3, 4, and 5 Warner & Swasey universal turret lathes, can be supplied with a knock-off mechanism for semi-automatic operation if desired. 70

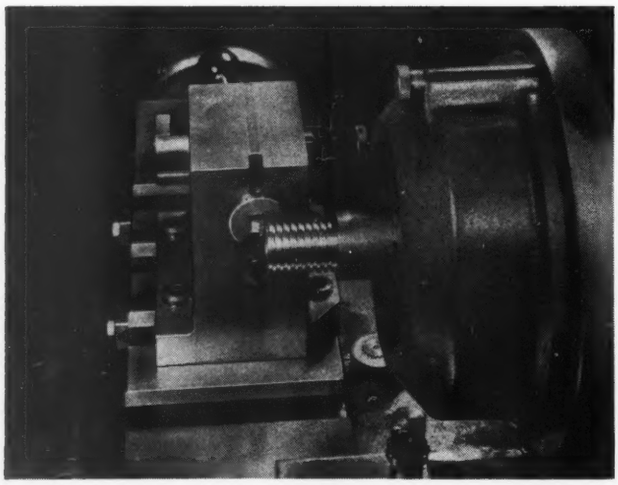
Optically Controlled Indexing Table

An optically controlled rotary indexing table with provision for making all settings of the table through the medium of a system of lenses has recently been brought out by the F. T. Griswold Mfg. Co., 305 W. Lancaster Ave., Wayne, Pa. The lenses are used in conjunction with a master reference drum on which 360 finely engraved lines are equally spaced about the periphery. The lenses pick up and reproduce the engraved reference lines, so that they can readily be seen through the viewing glass, even at a distance of 12 inches.

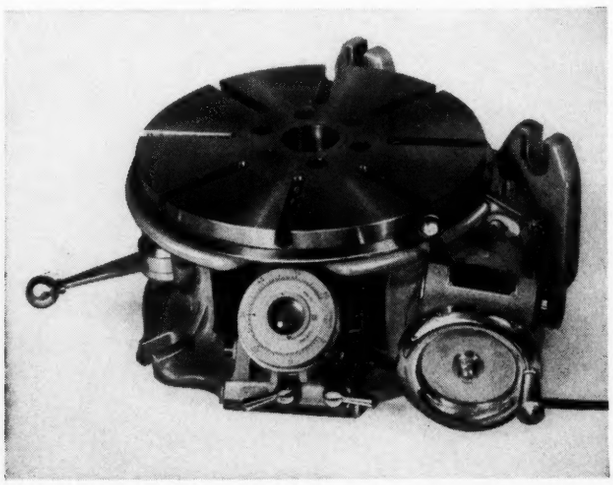
To set the table, the platen is rotated until the reference line representing the number of degrees of movement desired is centered between two parallel graduations on the reticule in the optical control unit. For movements of less than 1 degree, the reticule can be moved by rotating the micrometer dial, which is graduated in increments of 30 seconds, so that the table can be quickly set with extreme accuracy. Spindle run-out is held to within 0.0002 inch, and the maximum error of indexing does not exceed 0.0005 inch measured at the periphery of a 12-inch diameter circle.

This OPL table is intended especially to be used on milling machines, jig-borers, and die-sinkers for indexing and rotary milling. It can also be employed to advantage for inspection work. The table can be operated in a vertical or a horizontal position.

The turntable has a diameter of 11 1/2 inches. When in the horizontal position, the unit has a height of 6 inches, and when in the vertical position a height of 13 1/4 inches. The swing, in the vertical position, is 12 1/4 inches, which can be increased to 18 1/4 inches by means of 3-inch raising blocks. The maximum diameter of the hole through the spindle is 1 1/2 inches. The complete unit weighs 125 pounds. 71



Warner & Swasey lathe equipped with thread-cutting attachment



Optically controlled indexing table made by F. T. Griswold Mfg. Co.

To obtain additional information on equipment described on this page, see lower part of page 202.



Swiss precision watchmaking machines introduced in this country by the George Scherr Co.

Precision Watchmaking Machines

The George Scherr Co., Inc., 200 Lafayette St., New York 12, N. Y., has recently introduced in this country a set of five Swiss watchmaking machines. These precision machines comprise a gear and pinion cutting machine shown at the left in the illustration; a cutter sharpening machine for small diameter cutters illustrated in the view to the right; and a pinion tooth polishing machine shown in the center view.

Other machines in the set, not illustrated, include a pivot burnishing or rolling machine with tungsten carbide wheels which burnish the pivots, bringing them to the exact size and giving them a fine polished surface finish. The fifth machine is a riveting machine designed to assemble gears on their shafts, the shafts being rotated before the riveting starts.

The gear and pinion cutting machine first mentioned has a magazine feed and will cut pinions from the smallest size up to 1/4 inch in diameter. The tooth polishing machine shown in the center view uses a specially prepared wood disk to polish the teeth of pinions or gears on the flank to remove the slight roughness remaining after cutting.

The wood polishing disk is provided with a thread having a pitch corresponding to that of the gear to be polished. When engaging the teeth the pinion is rotated automatically while a reciprocating motion is applied, the stroke being selected to suit the face and width of the work. The wood disk is charged with fine grain rouge to produce the high finish required for as nearly as possible frictionless operation of gears in watches or instruments. 72

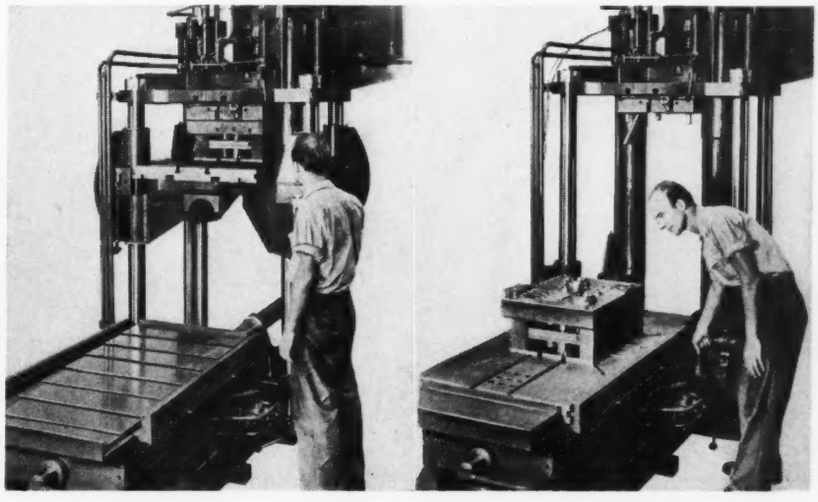
Lester Die Testing Machine

A die testing machine that opens and closes dies with such accuracy that the parting line can be matched with a high degree of precision before the die leaves the tool-room is a recent product of the Lester Engineering Co., 2711 Church Ave., Cleveland 13, Ohio. This machine is designed to eliminate the expensive and often hazardous practice employed by diemakers in matching parting lines, "bluing in" a die, and checking slides and moving cores.

The two halves of the die to be matched are clamped to the two machine platens. The bottom platen moves down and then moves out horizontally. The die is thus brought to a convenient height and out in the open, as shown in the view to the right in the illustration. In this position, it can be easily worked upon. It can then be quickly moved in and up to the position shown in the view to the left, in accurate alignment for checking.

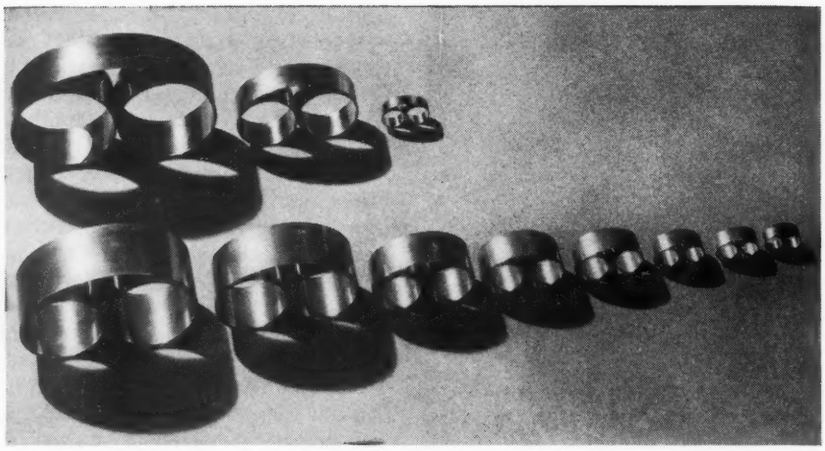
The machine is unique in that the oil cylinders are located inside two of the vertical columns. The bottom plate is movable, and yet there is no need for a pit to accommodate an oil cylinder. Although the vertical travel is 36 inches, the machine can be installed where the ceiling height is only 10 feet.

The principal specifications of the new die testing machine are as follows: Locking pressure, 50 tons; minimum die height, 14 inches; vertical die opening, 36 inches; daylight opening, when fully opened, 50 inches; horizontal stroke of die table, 52 inches; and size of die table, 28 by 58 inches. The machine weighs approximately 15,000 pounds, and is 112 inches high, 68 inches wide, and 136 inches long; it is equipped with a 10-H.P. motor. 73



Die testing machine brought out by the Lester Engineering Co.

To obtain additional information on equipment described on this page, see lower part of page 202.



Kit of spring clamps brought out by Hunter Spring Co. to facilitate selection of sizes best suited to specific applications

Hunter Spring Clamp Kit

A new "Try-It-For-Size" kit of eleven different sizes of one-piece coil-form gripping devices has recently been introduced to industry by the Hunter Spring Co., 1 Spring Ave., Lansdale, Pa. This kit has been brought out to help research, maintenance, production, and display workers investigate the possible uses for this product and determine which styles and sizes of these clamps are best suited to their needs.

The assortment of spring clamps includes one each of the eleven standard sizes, which have clamping pressure capacities ranging from 5 ounces to 18 pounds; automatic take-up and constant pressure up to maximum openings of 3 1/4 to 20 inches; widths from 1/4 inch to 1 1/4 inches; and coil diameters from 5/16 inch to 2 inches. 74

Automatic Indexing Gage for Press Brakes

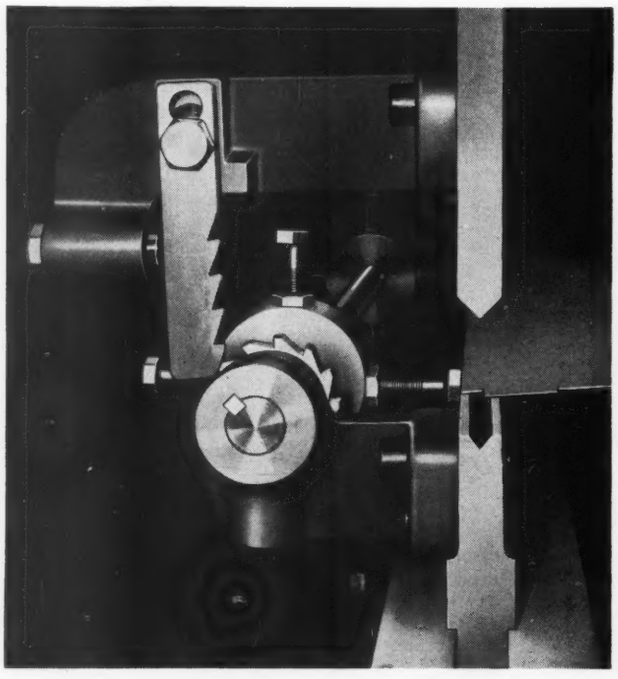
The General Gas Light Co., 202 N. Park St., Kalamazoo, Mich., has developed an automatic self-indexing rotary type gage for press brakes which makes it possible to produce as many as four different bends in a piece of metal before it leaves the operator's hands. Easy setting, accurate gaging, and saving of material-handling time are advantages claimed for this new product, known as the "Humphrey Rodex."

The gage consists of a rack and gear assembly which automatically rotates the adjustable gage stops into position and holds them securely until the bend has been made. On the down stroke of the press, the rack attached directly to the punch, engages the gear, and on the up stroke, it brings the stops into the position required for the second bend. Provision is made for disengaging the rack from the gear to permit the use of the equipment as a single-stop gage. 75

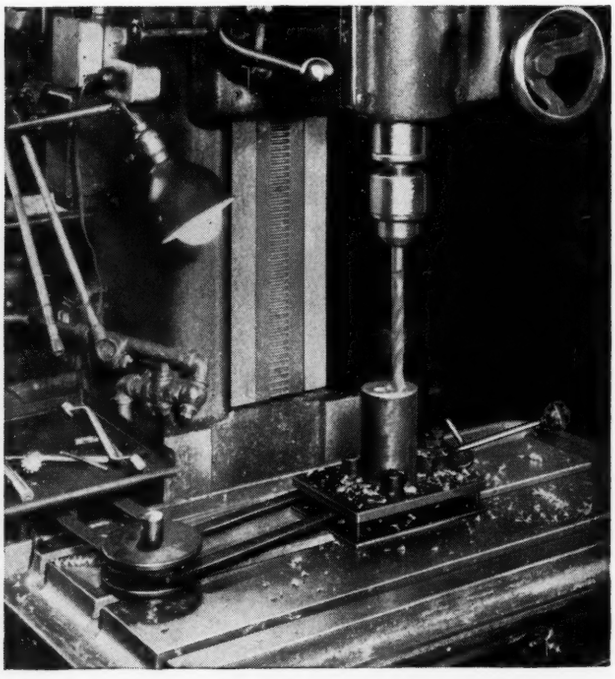
"Torkarm" Work-Holder Attachment for Drill Press

A work-holder attachment for drilling and tapping machines, known as the "Torkarm," which holds the work securely and yet permits it to be easily moved to any desired position on the machine table has been introduced by Torkarm Corporation, 2908 Emerson Ave. S., Minneapolis 8, Minn. The Torkarm converts the torque of a rotating drill, tap, or reamer into a useful force that aids in holding the work in place.

From a single-purpose fixture-holder, the Torkarm has been developed into a multiple-purpose device, which can be quickly



Automatic indexing gage for use on press brakes



Drilling machine equipped with work-holding Torkarm

To obtain additional information on equipment described on this page, see lower part of page 202.

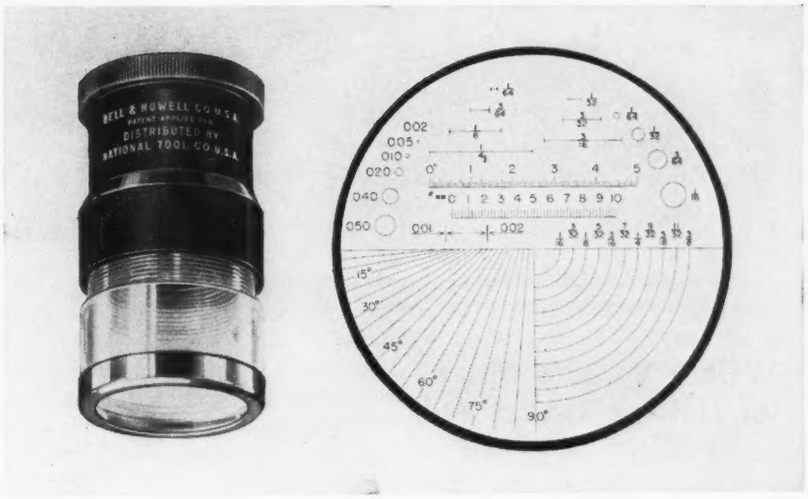
clamped to almost any drill press or vertical tapping machine without using a bracket or drilling a hole. A series of cam-locking and hold-down work-plates, which makes it possible to quickly drill, tap, or ream any shape or size of piece, regardless of the horsepower applied, has been developed for use on the Torkarm. "Tumble" jigs can also be used between two pieces on these plates to absorb all of the torque and yet permit the jig to be "tumbled" at will and rapidly moved across the table as required.

The "free-movement torque absorption" is due to the action of two pairs of hinged arms, mounted on fixed centers at both ends and in the middle. The hinged feature allows free lateral movement, and the fixed-center arrangement forces the arms to remain parallel, which, in turn, insures their remaining of equal length, regardless of any position in which they may be placed. With this arrangement, the work-plate cannot rotate. Thus the plate remains stationary under torque, but moves freely across the table in any direction when lateral force is applied, as in moving work from center to center under a drill spindle. 76

Columbia Vertical Milling Machine with Adjustable Head

A vertical milling machine of rugged construction, designed to hold work to a tolerance of 0.001 inch has been announced by Columbia Enterprises, Inc., Grayslake, Ill. The adjustable swivel-head with which the machine is equipped enables milling, drilling, boring, and routing operations to be performed at any angle. The spindle is equipped with tapered Timken bearings, which maintain accurate alignment and carry both radial and thrust loads, transmitting smooth maximum power to the cutter at any angle.

A variety of spindle speeds and easy set-up features adapt the machine for a wide range of production, tool-room, maintenance, and experimental work. The regular bench model is arranged for motor drive. Optional equipment includes floor stand with built-in cabinet; lay-out table; swivel-base vise; and 1/3-H.P., single-phase, 1750-R.P.M. motor. 77



Pocket-size optical comparator introduced by National Tool Co.

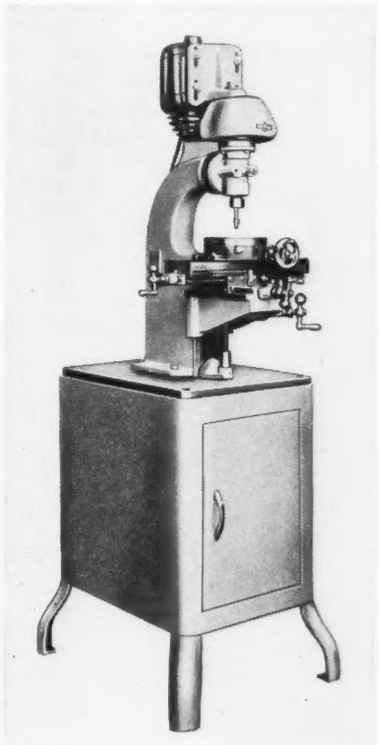
Pocket-Size Optical Comparator

A high-precision pocket-size optical comparator for inspecting or measuring small parts or details of large parts is being introduced to the trade by the National Tool Co., 11200 Madison Ave., Cleveland 2, Ohio. This instrument is manufactured by the Bell & Howell Co., and although not previously available to the trade, it has been used extensively by the manufacturer for the last five years.

The comparator embodies a new design principle that enables the part being checked to be viewed through a magnifying lens and compared directly with a master outline or accurately calibrated reticule in the instrument. As shown in the view to the right in the illustration, the reticule is calibrated for measuring lengths, widths, complete circles, radii, and angles.

The upper part of the reticule has lengths graduated in steps ranging from 1/64 to 1/4 inch, a linear rule of 1/2 inch with 0.005-inch graduations, a 10-millimeter rule graduated in increments of 0.2 millimeter, and circles ranging from 0.002 to 0.050 inch in diameter and from 1/64 to 1/16 inch in diameter. The lower half of the reticule is designed for measuring angles from 0 to 90 degrees in steps of 5 degrees and for measuring radii from 1/16 to 3/8 inch.

The instrument is adapted for checking the forms and sizes of punches, dies, templets, lay-outs, forming tools, and tool bits, as well as the sizes of small holes, fine screw threads, and holes.....78

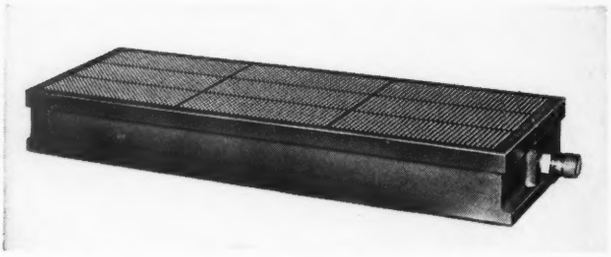


Vertical milling machine brought out by Columbia Enterprises, Inc.

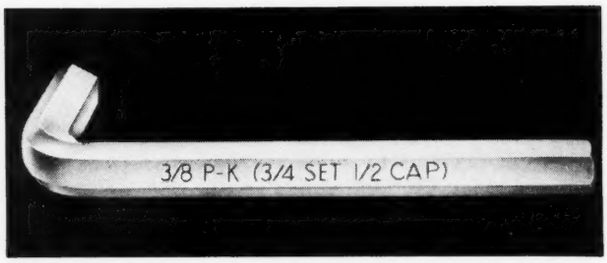
High-Pressure Hydraulic Cylinders

The Northern Tool & Machine Co., Melrose Park, Ill., recently announced a new line of single- or double-acting high-pressure hydraulic cylinders. These cylinders are all steel with hard chrome-finished moving parts, and are designed for working pressures of 4000 pounds per square inch in range of 5 to 60 tons.....79

To obtain additional information on equipment described on this page, see lower part of page 202.



Vacuum chuck for holding non-ferrous and plastic materials developed by O. S. Walker Co.



"Size-marked" hexagon keys for socket screws made by the Parker-Kalon Corporation

Walker Vacuum Chuck for Holding Plastics and Non-Ferrous Metals

The O. S. Walker Co., Inc., Worcester, Mass., has announced a vacuum chuck designed especially to meet the requirements of the airplane and glass industries. This chuck is said to be of especial value in performing processing operations on non-ferrous materials. In the electrical manufacturing field, it has also been found useful for holding insulation materials while performing certain milling operations often referred to as "skinning," and for routing both thick and thin plastic and rubber composition materials. The new chuck can be furnished in a full range of sizes. 80

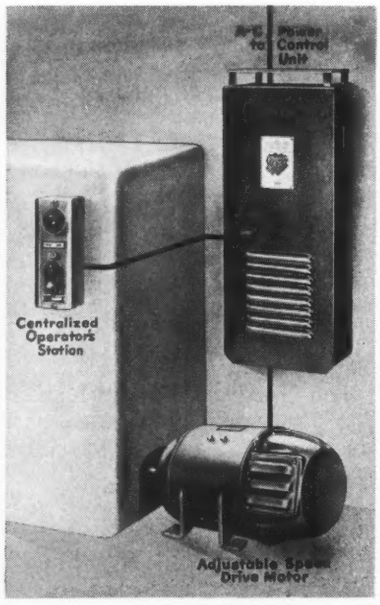
Reliance All-Electric Adjustable-Speed Drive

To meet the increasing demands for a smaller, less expensive all-electric adjustable-speed motor drive to operate on alternating current, the Reliance Electric & Engineering Co., 1111 Ivanhoe Road, Cleveland 10, Ohio, has brought out a new "V*S" unit. This variable-voltage unit is available in 3/4-, 1-, 1 1/4-, and 2-H.P. sizes, and is being built expressly to meet the special requirements of equipment manufacturers for more flexible methods of speed changing.

The drive is designed and built for continuous operation on single-phase, alternating-current power at speeds ranging from 290 to 2300 R.P.M. at the rated output, and as low as 80 R.P.M. for short periods or under a light load. Stepless speed selection and adjustment are provided throughout the operating range. When used with Reliance gearmotors, ranges of lower speeds are also available.

Operating features include quick, smooth starting and stopping; jogging and creeping speeds; and conveniently centralized control, either at the machine or any remote location desired. The design of the drive also makes it readily adaptable for application to existing machines or for installations on new units.

The drive consists of units arranged as shown in the accompanying illustration. 81



Electric adjustable-speed motor drive

Parker-Kalon "Size-Marked" Hexagon Keys for Socket Screws

"Size-marking" methods developed by the Parker-Kalon Corporation, 202 Varick St., New York 14, N. Y., to identify the company's socket-head cap-screws have now been applied to P-K "Engineered Hex Keys." As shown in the illustration, the key size and corresponding set-screw and cap-screw sizes are stamped clearly on the side of the handle. These "Hex Keys" are made of a special analysis alloy steel, and are heat-treated to assure maximum resistance to torque stresses and freedom from brittleness. They can be furnished in sixteen sizes with hexagon diameters ranging from 0.050 to 1 inch. Sets of the eleven keys most commonly used are obtainable. 82

"Kodagraph Autopositive Cloth" Facilitates Reproduction of Drawings

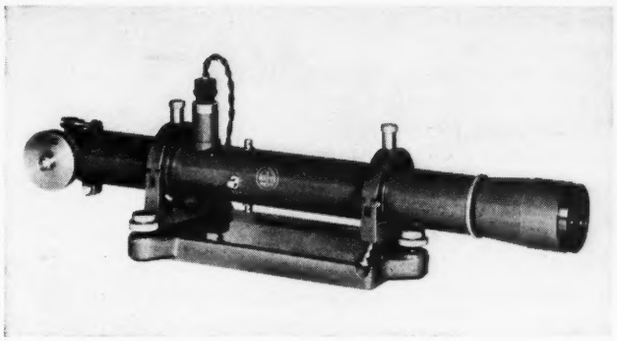
A new photosensitized cloth developed by the Eastman Kodak Co., Rochester 4, N. Y., enables cloth reproductions of engineering drawings to be made without the necessity for making a negative print. Like other "autopositive" materials, this new cloth can be used to produce a positive copy directly from a positive original drawing. It can be handled in normal room light and is exposed on conventional blueprint or direct-process machines or a vacuum printing frame.

In addition to eliminating the negative, which results in savings in time and materials, the new "Kodagraph Autopositive Cloth," as it is called, has the advantage of being free from distortion. It is highly translucent, assuring rapid production of high quality shop prints. Ink or pencil drawings can be made on either side of the cloth. It is available in 30- to 100-foot rolls in 20-, 30-, 36- and 42-inch widths. 83

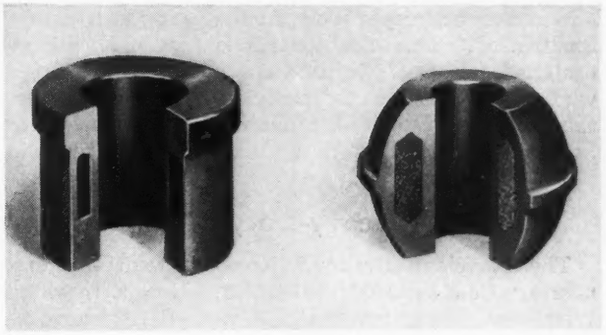
Auto-Collimator for Testing Alignment of Large Machine Units

The Engis Equipment Co., 431 S. Dearborn St., Chicago 5, Ill., is introducing in this country an 18-inch Watts "Auto-Collimator," which is adapted for use in align-

To obtain additional information on equipment described on this page, see lower part of page 202.



Alignment-testing Auto-Collimator for large machine units placed on the market by the Engis Equipment Co.



Sintered-metal bearings with oil cavities, announced by the Michigan Powdered Metal Products Co., Inc.

ing and measuring large machine members, using methods successfully employed in the optical industries.

The instrument produces a beam of parallel (collimated) rays of light, and measures to the accuracy of one-half second of arc any deviation between the original direction of the beam and its reflection by mirror or polished surface. With the aid of this instrument, it is possible, for example, to produce a chart showing waviness in a surface plate, machine bed, or shaft to an accuracy closer than 0.00004 inch; and by the use of simple accessories such as gage-blocks, angle gage-blocks, reflecting squares, mirrors, etc., a large number of extremely accurate angular measurements can be made.

Linear measurements can be determined by simple computation without regard to distance and without wear, and distortions due to temperature changes or other factors normally affecting the accuracy of precision measuring and inspecting operations can be measured. This instrument is adapted for use in the gage laboratory, tool-room, and shop. 84

Oil-Impregnated Sintered-Metal Bearings

A new type of oil-impregnated sintered-metal bearing, known as the Haller oil-well bearing, has been introduced by the Michigan Powdered Metal Products Co., Inc., Northville, Mich. A recent development in powder metallurgy is employed in producing these bearings with cavities of uniform size formed in the center of the bearing wall. As the sintered metal is impregnated with oil or grease by static pressure, the cavity or pocket, as well as the pores in the metal body of the bearing, becomes filled with lubricant, resulting in a much greater oil content than is possible in conventional bearings of this type.

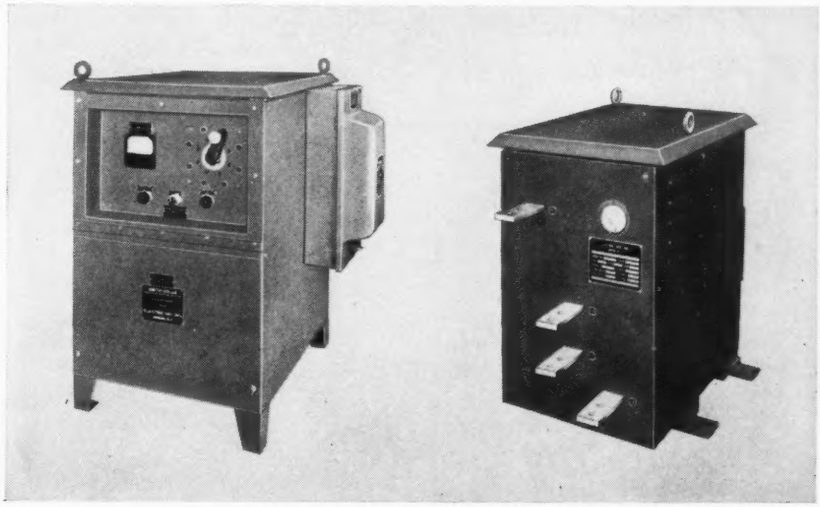
It is claimed that the improved lubrication and increased strength make it possible for these bearings to withstand heavier loads and practically eliminate "freezing" under the most adverse operating conditions. Since the oil is sealed in the body of the bearing, there is never any dripping or leakage of oil. The new bearing can be hardened and ground and may be impregnated with oil or grease to suit requirements.

These oil-well bearings are supplied in three types: The pocket type has an open cavity and is particularly suited for heavy loads; the sponge type bearing has a pocket filled with sponge iron to provide capillary action for retaining the oil, and is especially recommended for conditions where it is subject to heat; and the thin-walled type housing has a group of small holes which replace the pocket, so that the structure of the bearing wall is not weakened.

The bearings are adaptable to a wide range of applications for which conventional sintered-metal bearings are normally used. They are suitable for pillow blocks and motor bearings, and are especially applicable for use with large-diameter shafts. Their non-freezing characteristics also make them ideal guide-pin bushings. 85

Pre-Heating and Stress-Relieving Units for Welded Work

Electric Arc, Inc., 152-162 Jelliff Ave., Newark 8, N. J., has announced new combination equipment for preheating before welding and stress-relieving after welding. The 40-KVA Model RTA regulating unit and 40-KVA Model AC3 low-frequency induction heating unit are shown at the



Regulating and heating units for welded work placed on the market by Electric Arc, Inc.

To obtain additional information on equipment described on this page, see lower part of page 202.

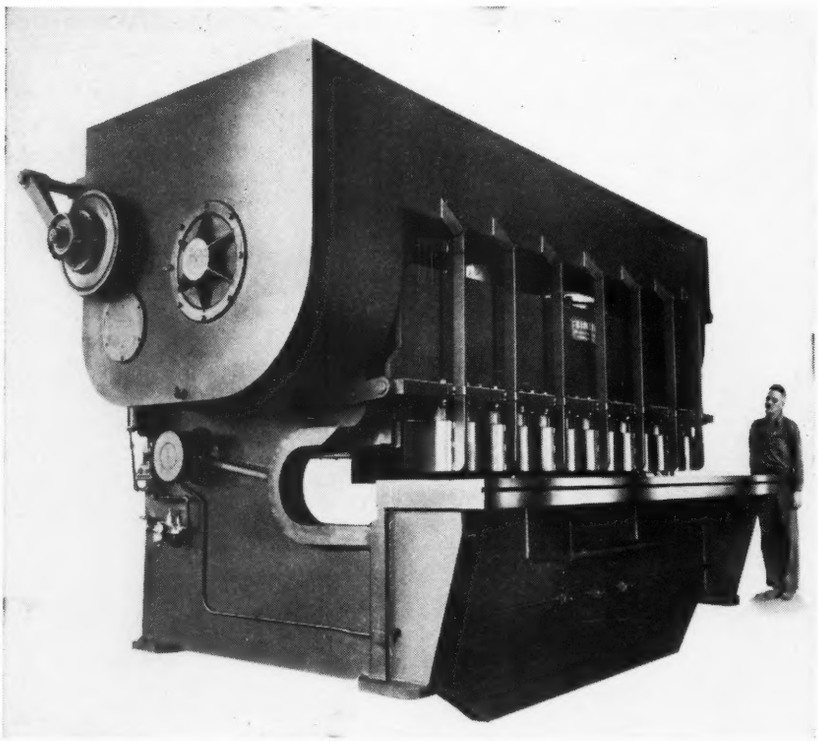
left and right, respectively, in the illustration. This combination is designed for use in limited space where the extreme flexibility of the company's smallest induction heater is not needed. The regulating unit is arranged for operation on 220 to 440 and 550 volts at commercial frequencies. The heating unit is small enough to be placed near the work for easy accessibility. 86

Heavy-Duty Steelweld Shear

The Cleveland Crane & Engineering Co., 5429 E. 281st St., Wickliffe, Ohio, has just completed the heaviest "Steelweld" shear it has ever built. The new machine has a capacity for shearing 12 feet of 1-inch thick steel plate. The new machine makes use of an exclusive pivoted-blade cutting principle which requires no slides or guides for the knife. With this arrangement, the upper blade operates on two heavy pins secured to the side frames and travels in a circular path.

An outstanding feature of the shear is the "Micro-Speed" knife adjustment, which facilitates quick changing of the knife clearance for shearing plate of various thicknesses. Adjustments are quickly made by turning a hand-crank until a dial indicator shows the correct clearance in thousandths of an inch. The indicator also shows the plate thickness that can be cut with any knife setting.

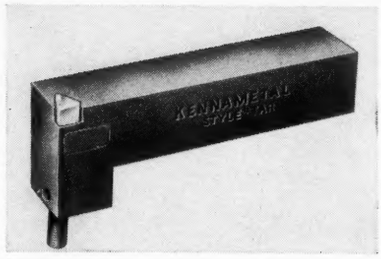
This shear cuts at the rate of twenty-five strokes per minute. It has a throat depth of 24 inches. Both frame and blade are of all-welded one-piece steel construction. The bed has ball-bearing transfers to facilitate movement of the steel through the knives. An electric foot-operated switch facilitates control of the machine. Safety features are provided throughout, and all rotating parts are at the rear of the machine. The knife and hold-downs are protected by a heavy plate type guard. 87



"Steelweld" shear for heavy-duty work placed on the market by the Cleveland Crane & Engineering Co.

Improved Kennamatic Tool-Holder

An improved Kennamatic tool-holder has been developed by Kennametal, Inc., Latrobe, Pa., that utilizes the standard Kennametal insert and incorporates other advantages. The steel shank is heat-treated to resist distortion and chipping, and thus provide greater durability and longer life. The split shank used in previous designs has been replaced by a solid type designed to resist deflection under load, provide solid backing in the direction of the cutting force, and insure more accurate indexing of the insert.



New Kennamatic tool-holder with improved features of design

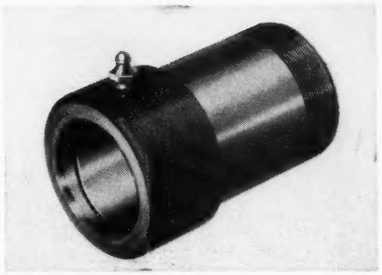
A broached hole fully encloses the insert, giving greater strength and rigidity. Separate clamping in the direction of the cutting forces provides more accurate indexing of the insert. Clamping screws are located at the front of the tool-holder where they are always accessible for tightening with a wrench. This permits changing the inserts even when tools are closely grouped side by side. A large-diameter hollow back-up screw is provided, which permits a dirt-clogged insert to be pushed out without disassembling the tool. The back-up screw is equipped with a friction lock, which requires no lock-nut. 88

Wet Abrasive Cleaning Equipment

The Hydrohone Equipment Co., 222 W. Chambers St., Milwaukee 12, Wis., is placing on the market a new suction gun for wet abrasive cleaning, which is designed to provide a uniform blast pattern without the "halo" effect. This gun is light in weight and made of non-corrosive metals. It is furnished with switch-operated solenoid controls for air and water supply, thereby eliminating excess piping and valves. The equipment can be used in place of the pumps ordinarily employed in abrasive cleaning cabinets.

A line of wet abrasive cleaning cabinets, including a small model designed particularly for tool-room and machine shops is also being marketed by this company. These cabinets are provided with a new system of ventilation. 89

To obtain additional information on equipment described on this page, see lower part of page 202.



Bronze-plated guide-pin bushing made by Lamina Dies & Tools, Inc.

Lamina Bronze-Plated Guide-Pin Bushings

Hardened steel bushings with bronze-plated bearing surfaces have been brought out in various sizes for use with all types of guide pins by Lamina Dies & Tools, Inc., 14925 W. Eleven Mile Road, Berkley, Mich. These hardened steel bushings have 0.001 to 0.002 inch of bronze electroplated on their inner bearing surfaces. The combination of hardened steel and bronze provides the long wearing quality of hardened steel without the danger of scoring or seizing.

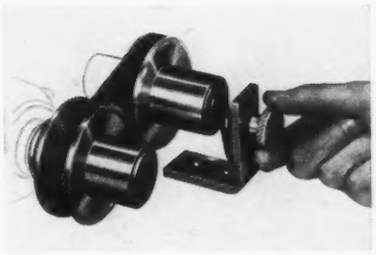
In addition to the bronze bearing surface, an oil-groove 5/32 inch wide is machined in the inner surface in a double figure-eight pattern. An "Alemite" fitting is mounted in the collar of the bushing through which lubrication can be fed to the groove....90

New Molybdenum Lubricant

Molybdenum lubrication has now been made available in a form suitable for use in any conventional lubricating system by a new development of the Lubricants Division of the Lockrey Co., 21-02 122nd St., College Point 1, N. Y. This new molybdenum-base lubricant is called "Liqui-Moly." It can be used alone or added directly to crankcase or other oils which carry it to the friction surfaces, where it "plates out" on the metal, providing a permanent low-friction anti-seizing coating.

The new lubricant displays remarkable chemical stability, and is unchanged in its properties by extremes of temperature, operating effectively at either sub-zero temperatures or red heat. Typical applications, aside from conventional use in automotive and other bearings and gears, are the lubrication of deep-drawing dies, precision-fit bearings and slides, pipe fittings, tight-wound flat coil springs, guns, rifles, etc. 91

Variable-Speed Combination Sheaves



Combination variable-speed sheaves announced by Speed Selector Inc.

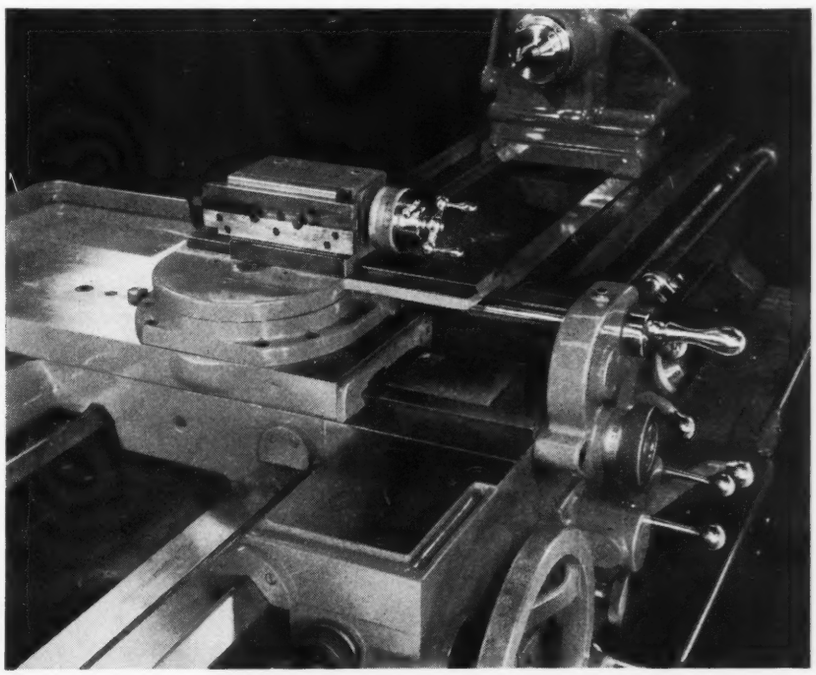
Five new sizes of single-groove variable-speed combination sheaves have been announced by Speed Selector Inc., 118 Noble Court, Cleveland 13, Ohio. These sizes cover a wide range of speed and load capacities up to 7 1/2 H.P., with speed changes as high as 7 to 1. The sheaves are designed to provide a simple, efficient, yet low cost means of producing wide variations of speed between fixed-center shafts through standard V-belts.

The new 3-, 4-, 5-, 6-, and 7-inch single-groove sizes are each available in two types—spring-loaded and controllable. This makes it possible to combine small driving sheaves with larger driven sizes to meet low-speed requirements or to use large driving sheaves with smaller driven sizes for high-speed ranges. A new 8-inch double-groove sheave is designed to transmit greater power, and cannot be combined with the smaller single-groove sizes.

The spring-loaded, variable-pitch driving sheave is usually mounted on the motor-shaft, and the controllable-pitch sheave is mounted on the driving shaft. 92

Ball-Turning Rest for Monarch Lathes

The Monarch Machine Tool Co., Sidney, Ohio, has brought out a ball-turning rest of improved design for use on the company's 14-, 16-, and 20-inch Series 60 engine and toolmaker's lathes. The new rest simplifies set-up operations, and can be easily and quickly applied to the machine. The regular bottom slide can be positioned either on center for ball turning or boring or out of alignment with the spindle center for spherical radius turning. A micrometer dial is provided for in and out adjustment of the bottom slide. The



Improved ball-turning rest set up on Monarch lathe for socket-boring operation

To obtain additional information on equipment described on this page, see lower part of page 202.

diameter of the ball or radius being turned can also be controlled accurately by a similar micrometer adjustment.

With this rest, a ball 4 inches in diameter can be turned on the 14-inch lathe, while balls 5 3/4 and 6 inches in diameter can be turned on the 16- and 20-inch lathes, respectively. When equipped with a 1-inch raising block, the rest can be used on the 16-inch lathe for turning a ball 7 5/8 inches in diameter.

Socket-boring operations can also be performed effectively as a result of this improvement in ball-turning rest design. The maximum size that can be bored is 4 inches on the 14- and 16-inch machines, and 6 inches on the 20-inch unit. On some classes of work, concave spherical surfaces with larger radii—up to as much as 11 or 12 inches—can be machined. 93

Automatic Coil Cradle

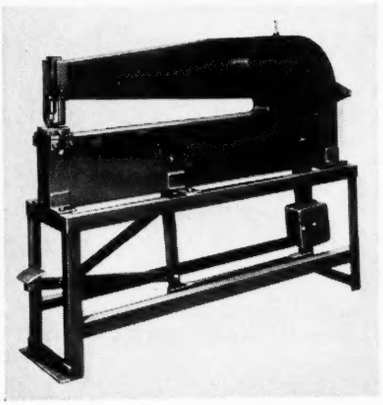
An automatic coil cradle designed to facilitate loading of coils of material has been brought out by the U. S. Tool Company, Inc., Ampere (East Orange), N. J. In loading, a wooden core is first inserted in the hole in the center of the coil and the coil support rod, which is furnished with the cradle, is then inserted in the hole in the wooden core. The entire coil can then be rolled along the floor and into position in the cradle, where it is raised from the floor by means of a handwheel. This method of handling coils eliminates the need for hoists, and also saves manual labor.

The automatic coil cradle will handle coils up to 40 inches outside diameter, weighing up to 1000 pounds, with material up to 6 inches wide. The cradle is equipped with hardened and ground feed-rolls, mercury switch control, and motor for operation on 220- to 440-volt, three-phase, 60-cycle alternating current. The mercury switch control provides a loose loop of material between the cradle and the fabricating machine, which loop serves to reduce the strain on the operator or on the feed unit of the machine. 94

Whitney Large-Size Foot Press

An exceptionally large foot-operated press with a 4-foot throat depth and a capacity for punching a 2-inch hole through 16-gage mild steel has been placed on the market by the Whitney Metal Tool Co., Rockford, Ill.

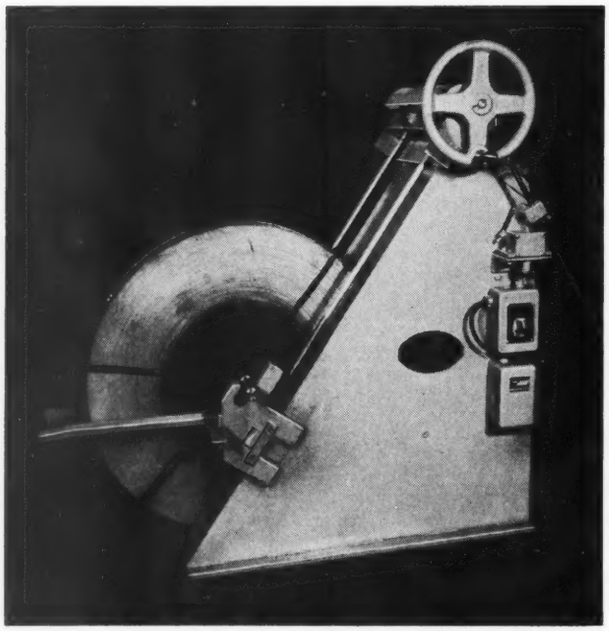
With this press, one man can punch holes in sheets up to 4 feet in width at a fast rate, since the sheets can be slid into the extra deep throat of the machine, permitting the punching operations to be performed along the edge nearest the worker. This permits the worker to assume a normal position in locating parts and operating the foot-pedal. Accessories such as large work-tables, guides, gages, punch-holders, and die-shoes are available. 95



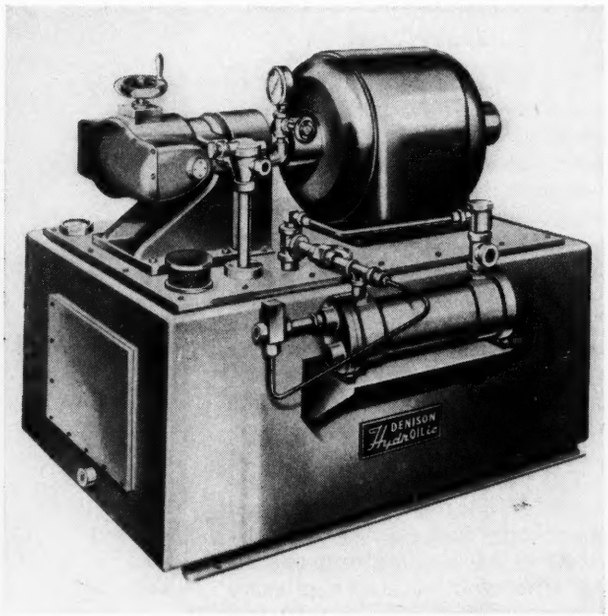
Whitney large-size foot-operated press

Denison High-Pressure Oil-Hydraulic Pumping Units

To meet a wide range of fluid power requirements for machine tools and other industrial equipment, the Denison Engineering Co., 1152 Dublin Road, Columbus 16, Ohio, has brought out a completely new series of oil-hydraulic pumping units for pressures up to 5000 pounds per square inch. These high-pressure units are available in twenty-two models,



Automatic coil cradle made by U. S. Tool Company, Inc., for rapid loading of coils



High-pressure, oil-hydraulic pumping unit made by the Denison Engineering Co.

To obtain additional information on equipment described on this page, see lower part of page 202.

designed to specifications recommended by the Joint Industry Conference, Hydraulic Standards for Industrial Equipment.

Each unit consists of a reservoir base with all operating components, including pump, relief valve, gages, and electric motor drive mounted on the removable top cover. This is a simple, compact arrangement. The reservoir of these pump units is supplied in capacities of 55, 110, and 165 gallons. It is of welded steel construction, and has a door at the end to simplify cleaning.

A choice of three series of hydraulic pumps is available. These are of the axial piston type, and can be supplied for either constant- or variable-volume operation. The variable-volume pumps are obtainable with handwheel, pressure-compensating, stem, or cylinder type oil-delivery controls. The pump and electric motor are mounted horizontally on the reservoir cover and connected by a flexible coupling. Motors supplied with this equipment range from 5 to 75 H.P. Optional equipment available to further extend the versatility of these high-pressure oil-hydraulic pumping units includes a heat exchanger attachment, which can be provided for cooling oil in the hydraulic system, and a vacuum gage, which permits easy checking of the condition of the oil filter within the reservoir. ---------- 96

Rotary Work-Aligner for Welding Operations

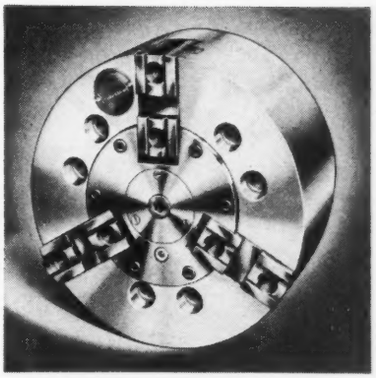
The Johnson Machine Works, 619 Menomonie St., Eau Claire, Wis., has brought out a new rotary work-aligner for handling all types of materials requiring rotation in manufacturing, assembling, welding, and repair work. The device is designed to insure accurate alignment of two or more pieces of work. It can be used for either centered or uncentered work and for checking alignment or run-out on any cylindrical material from 1/4 inch to 24 inches in diameter. There are no limits to the length of material that can be handled, since two or more of the aligners can be used for long sections.

Four models are available in bed lengths ranging from 5 feet 10 inches to 11 feet 6 inches, with maximum load capacity of 1500 pounds. ---------- 97

Dayton-Rogers Drawn-Shell Trimmer

The Dayton Rogers Mfg. Co., 2824 Thirteenth Ave. S., Minneapolis, Minn., has announced a new universal flat-edge drawn-shell trimmer. This machine will trim drawn shells of practically any depth made from alloy sheet material in thicknesses up to 16 gage.

The trimmer is equipped with a universal external rotary cutter blade, and it is only necessary to provide a profile mandrel about 1/2 inch thick to fit the shell to be trimmed which will engage the blade at the correct trimming point. The work cycle of the machine can be varied, the maximum trimming speed being sixty-five shells per minute. The trimmer can also be used to advantage on second-operation work, such as forming, beading, flanging, and knurling. ---------- 98



Light-weight "Whitaloy" chuck made by Whiton Machine Co.

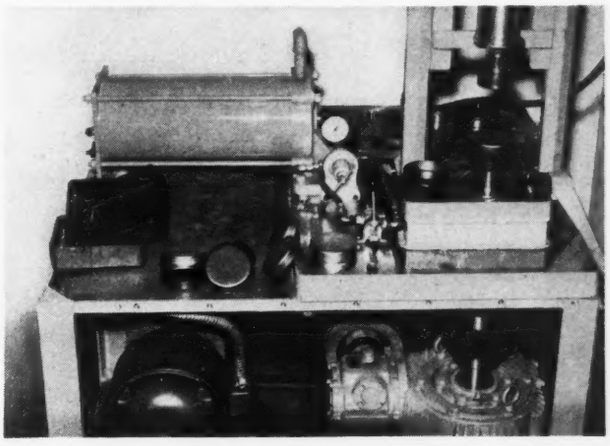
Light-Weight "Whitaloy" Chucks

The Whiton Machine Co., New London, Conn., has developed a new special-analysis, heat-treated aluminum alloy for the specific purpose of reducing the weight of the company's lathe chucks. This material, known as "Whitaloy," is said to possess the strength of steel and the wearing quality of cast iron. The substantial reduction in weight of chuck bodies made of the new material is of major importance where high spindle speeds are required. Whitaloy power-operated chucks facilitate quick starting and stopping, eliminate spindle drag, and reduce strain on the braking mechanism.

These new chucks are constructed to insure great gripping power and to maintain their built-in accuracy over a long period. They have only four moving parts —the wedge and three jaws. This simple construction also insures greater safety, as the wedge angle is such that when the chuck grips

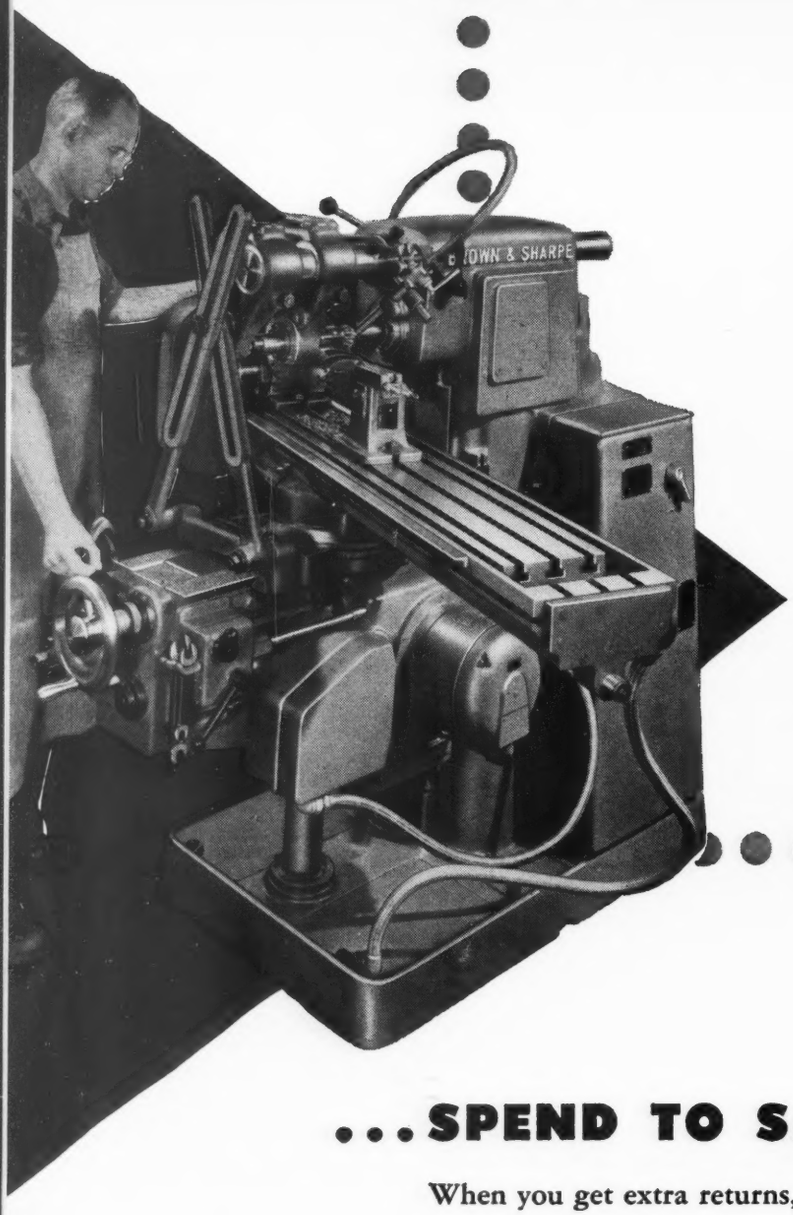


Johnson rotary work-aligner for welding operations



Drawn-shell trimmer built by Dayton Rogers Mfg. Co.

To obtain additional information on equipment described on this page, see lower part of page 202.



Look to the future when you buy ...for the present...

...SPEND TO SAVE

When you get extra returns, *far into the future,* on your investment in today's machine tools and equipment . . . you *spend* to *save.* You gain not only immediate advantages . . . simplified operation, high accuracy and convenient versatility . . . but also an extremely long productive life. These are the recognized advantages of Brown & Sharpe precision-built machines . . . highly profitable to industry the world over.

Investigate the Brown & Sharpe line before you buy for the present. *Spend to save.* Complete information about any machine sent on request. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

BROWN &

MILLING MACHINES

Universal
Plain (including manufacturing type)
Vertical

GRINDING MACHINES

Universal
Plain
Surface
Cutter and Tool

SCREW MACHINES

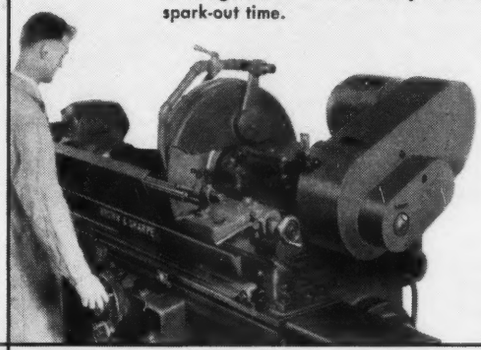
Automatic (including screw threading, pinion turning and cutting-off types)
Wire Feed

RECENT MACHINE TOOL DEVELOPMENTS

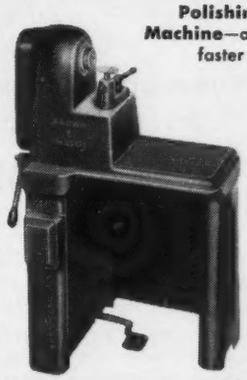


2L and 2LB Surface Grinding Machines—automatically lubricated—for trouble-free, precision surface grinding under extra dusty or severe operating conditions.

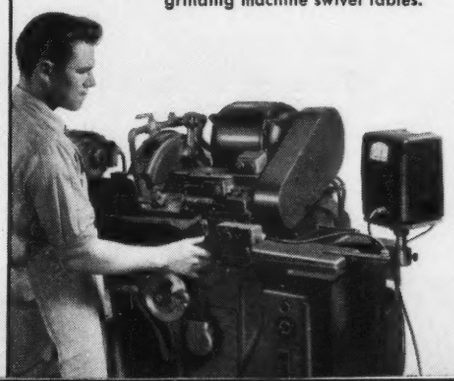
Automatic Cycle and Spark-Timing Arrangement automatically controls spark-out time.



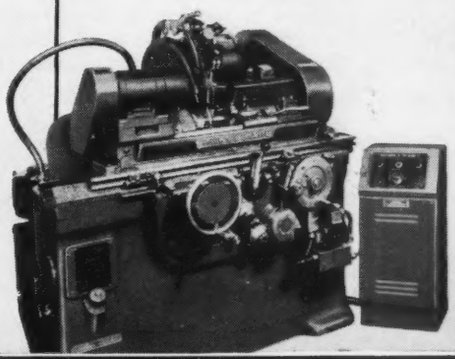
Polishing and Finishing Machine—a complete unit for faster polishing, burring and filing



Electralign, an exclusive new development, for electronic alignment of grinding machine swivel tables.



Automatic Cycle and Sizing Arrangement automatically sizes from the work.



SHARPE

B·S

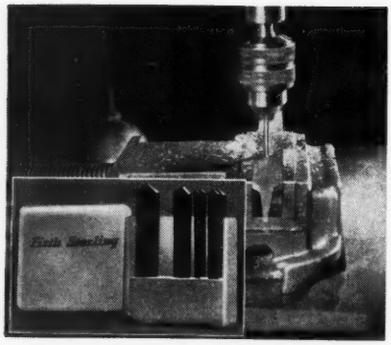
the work firmly, it will not release it through air failure, but can be released by applying force on the draw-bar in the reverse direction.

The jaws, wedge, and wedge bushing are manufactured from alloy steel. The top surface of the master jaw is machined with a tongue and groove of American standard dimensions. A steel plate is fitted to the face of the chuck to protect the working parts from chips and other foreign matter. The power most commonly used for operating these chucks is supplied by air cylinders.

These power-operated chucks are specially suitable for use on turret and engine lathes, as well as other automatic machines employed for long runs of repetitive work. 99

Firthite Hard-Metal Drill Kit

The Firth-Sterling Steel & Carbide Corporation, McKeesport, Pa., has developed a Firthite drill designed especially for drilling metals of any hardness up to 66 Rockwell C. For example, the new



Firthite hard-metal drill kit brought out by Firth-Sterling Steel & Carbide Corporation

drill will penetrate materials of a hardness equal to that of high-speed steel tool bits or the softer grades of carbide.

These drills are ground from solid Firthite (sintered carbide) cylinders. They are pointed and relieved for free cutting, and are said to produce an excellent finish without discoloring or drawing the temper of the material drilled.

The drills are available in six sizes ranging from 1/8 to 1/2 inch. A complete set of six drills is available in a pocket-size kit. 100

Precision Parallels Made of Granite

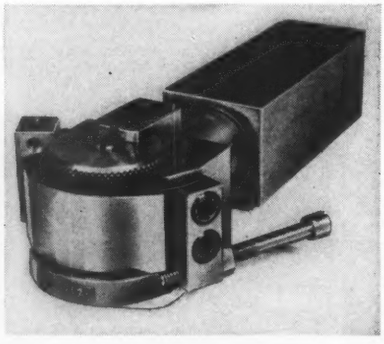
Black granite precision parallels claimed to be accurate within a tolerance of 0.00005 inch are being manufactured by the Rahn Granite Surface Plate Co., 1149 Platt Circle, Dayton 7, Ohio. These parallels are supplied in sets with sizes ranging from 1/2 inch by 1 inch by 6 inches up to 1 inch by 2 inches by 12 inches. Parallels of larger sizes ranging up to 4 by 6 by 30 inches can also be provided. These parallels are made by a hand lapping process instead of by grinding.

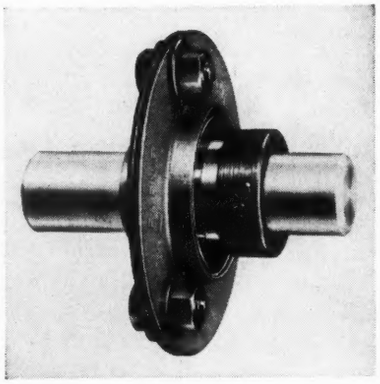
The original accuracy of the granite parallels is said to be maintained indefinitely, due to the nature of the black granite, which is harder than tool steel. The granite will not rust, and should it be accidentally nicked, no burr would be raised. Neither can abrasives become embedded in this hard material.

These parallels are recommended for use only where extreme accuracy is required and by persons trained in the care of precision instruments. 101

Automatic Marker for Screw Machines

Automatic marking device, called the "Automarx," which roll-stamps part numbers or trademarks on metal parts as they are processed in multiple-spindle screw machines. Designed to be mounted between tool positions on the machine. An adjustable head permits quick settings for round stock 1/4 inch in diameter and larger, while the removable roll-stamp enables the markings to be quickly and easily changed for different parts. This also permits regulating the depth of the imprint. The marker operates during the indexing movement of the machine. Announced by the Special Screw Products Co., 5445 Dunham Road, Bedford, Ohio. 102



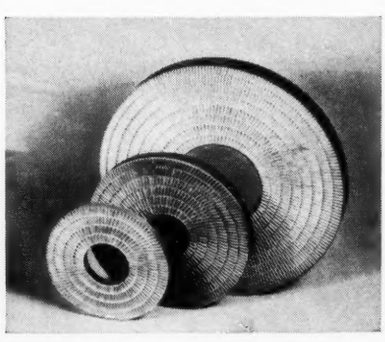


Fafnir Self-Aligning Ball Bearings with Flanged Housings

"Flangette" ball bearing designed primarily for light-duty, slow-speed applications, developed by the Fafnir Bearing Co., New Britain, Conn. Comprises simple arrangement of two pressed-steel stampings which form an inexpensive flanged housing enclosing the standard Fafnir self-aligning wide inner-ring type ball bearing. Light weight, low cost, factory sealed-in lubrication, and easy installation are advantages claimed for this ball bearing power transmission unit. Available for shafts of eighteen sizes ranging from 1/2 inch to 2 3/16 inches in diameter...103

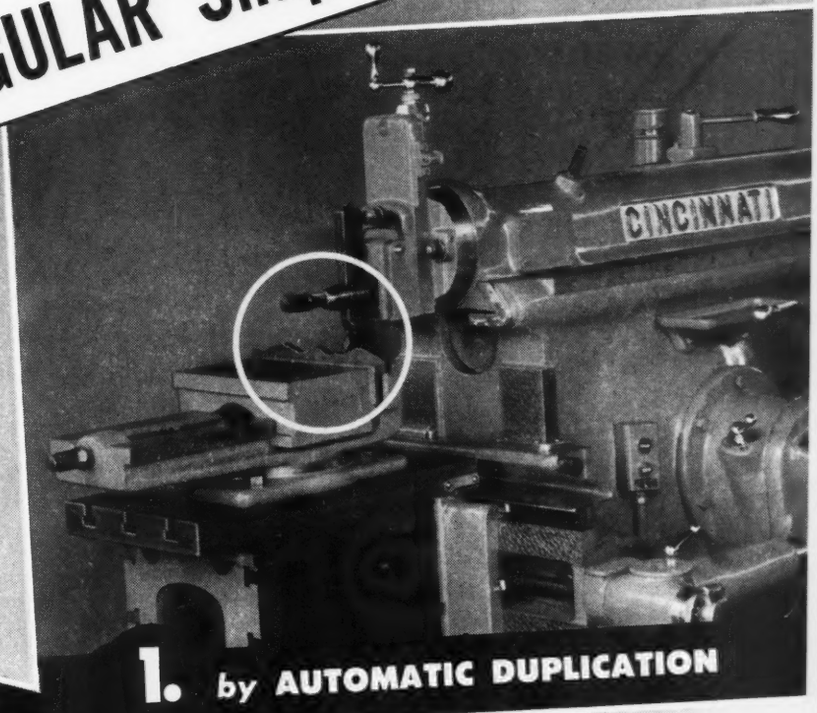
Kennametal Disk File for Non-Ferrous Metals and Plastics

New type of disk file developed by Kennametal, Inc., Latrobe, Pa., to provide for faster, more economical finishing operations on non-ferrous metals and plastics. Applicable for such operations as snagging castings, cutting off flash, facing and squaring up surfaces, etc. The sharp cutting edges of these files are formed by triangular-shaped prisms of Kennametal, copper-brazed to the face of a steel back-up plate. These disk files are available in four sizes having diameters of 6, 8, 10, and 12 inches. Can be mounted on a grinder, abrasive-disk machine, motor end, or disk filing machine by means of an adapter. Recommended speeds range



To obtain additional information on equipment described on this page, see lower part of page 202.

Contouring IRREGULAR Shapes



1. by AUTOMATIC DUPLICATION



2. by MANUAL CONTROL

Cincinnati Shapers contour irregular shapes —economically—whether in the tool room or in the manufacturing plant.

(1) Where production is desired, costs are reduced by accurate automatic duplication.

(2) A unit or small lot is economically produced by manual control

Accurate, sensitive, vertical and front controlled cross feeds and the overall accuracy of a Cincinnati Shaper enable the operator to work to very close limits.

Write for information on contouring irregular shapes on a Cincinnati Shaper, the handy man of tool rooms and shops.



THE CINCINNATI SHAPER CO.

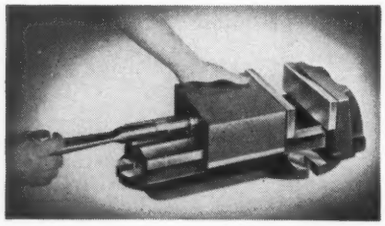
CINCINNATI 25, OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

from 5000 to 7000 surface feet per minute for the harder materials, and from 8000 to 9000 surface feet per minute for soft or gummy materials...104

Ames Precision Machine Vise

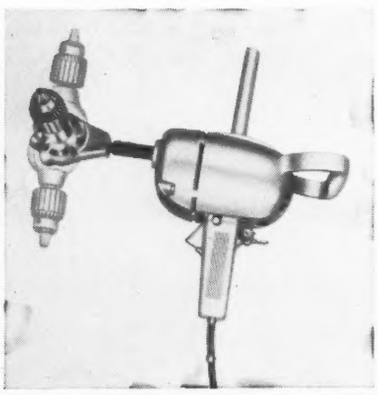
Vise designed for milling machines, drill presses, and shapers, with jaws 8 inches wide that can be opened to their full 11-inch capacity quickly and tightened easily with a powerful gripping pressure. A fractional turn of the wrench

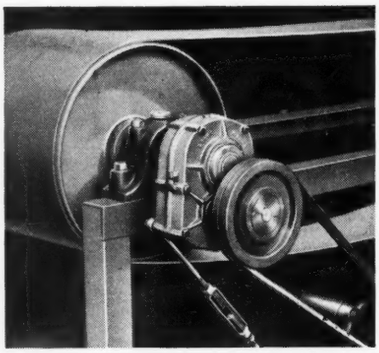


causes the jaws to instantly grip or release the work at any jaw opening, the sliding block being quickly moved to any position. The body of the vise weighs 85 pounds, and the sliding block weighs 40 pounds. These two members can be quickly taken apart. The jaws and rails for the sliding block are hardened and accurately ground for long use. Recently added to line of precision tool equipment made by Ames Precision Machine Works, Waltham 54, Mass. 105

Angle-Head Attachment for Portable Drill

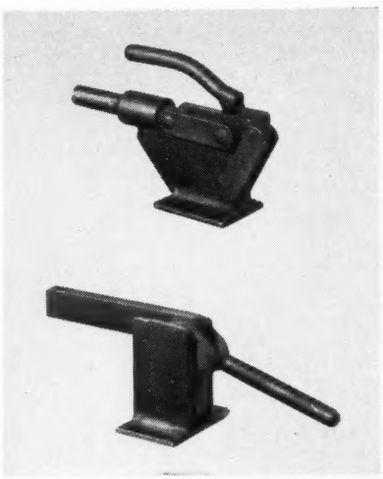
New 360-degree angle-head attachment for 1/2-inch capacity drills. Designed by Cummins Portable Tools, Division of Cummins Business Machines Corporation, 4740 Ravenswood Ave., Chicago 40, Ill., for drilling in hard-to-get-at spots encountered in everyday work by electricians, plumbers, and maintenance and installation men. The angle-head can be quickly removed to convert the tool into a conventional 1/2-inch drill. The head weighs 2 pounds. No-load spindle speed on right-angle head is 275 R.P.M. when used with Model 200 Cummins drill.....106





"Torque-Arm" Speed Reducer

Speed reducer recently added to the line of power transmission equipment made by the Dodge Mfg. Corporation, Mishawaka, Ind., which is known by the trade name "Torque-Arm." This speed reducer can be mounted directly on the shaft to be driven. A torque arm anchors the reducer and provides quick, easy adjustment of the belt tension through the use of a turnbuckle. Different output speeds can be attained by changing one of the sheaves in the drive. The reducer can be easily shifted from one machine to another. An ingenious back-stop is available for use whenever it is required to prevent reversal of the load. The reducer is made in six sizes with capacities ranging up to 28.5 H.P. 107

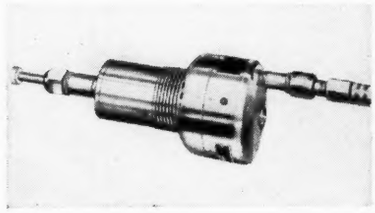


Heavy-Duty Work-Holding Clamps

Two new heavy-duty clamps developed by the General Welding Co., 7404 Euclid Ave., Cleveland 3, Ohio. These clamps are of rugged all-welded construction. The clamp shown in the upper view has a bronze plunger which prevents weld spatter from adhering and interfering with the operation of the clamp. This clamp has an extra long stroke of 1 3/4 inches and will exert a maximum pressure of 700 pounds. The horizontal type toggle clamp shown in the lower view is recommended especially for milling and drilling operations. The pressure rating of this clamp is 1000 pounds, although much higher pressures can be obtained by shortening the work bar. 108

Onsrud Air-Turbine Motor Grinder with Automatic Governor

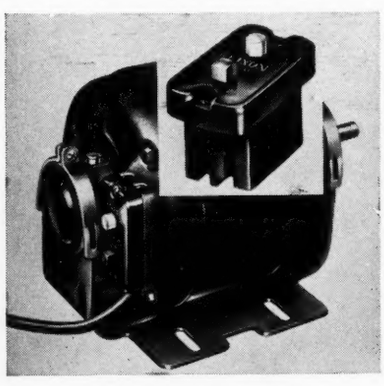
New grinder with air-turbine motor having an automatic governor that maintains constant speed under load. Introduced by the Onsrud Machine



Works, Inc., 3940 Palmer St., Chicago 47, Ill. The 1/2-H.P. air motor is designed to operate at 50,000 R.P.M. The automatic governor is actuated by centrifugal force developed by the rotation of the grinder spindle. 109

Klixon Manual Motor-Starting Switch and Overheat Protector

Klixon motor-starting switch and overheat protector for manually started motors brought out by the Spencer Thermostat Division of Metals & Controls Corporation, Attleboro, Mass. This new manually operated switch starts and stops the motor, protects it from overheating and burning out, and eliminates the centrifugal switch normally built into the motor. It also replaces a separate "on-off" line switch and manual reset inherent protector. It can be used in a wide range of applications, including bench grinders and other types of appliances and equipment, using manually started fractional-horsepower motors from 1/12 to 1/2 H.P. 110

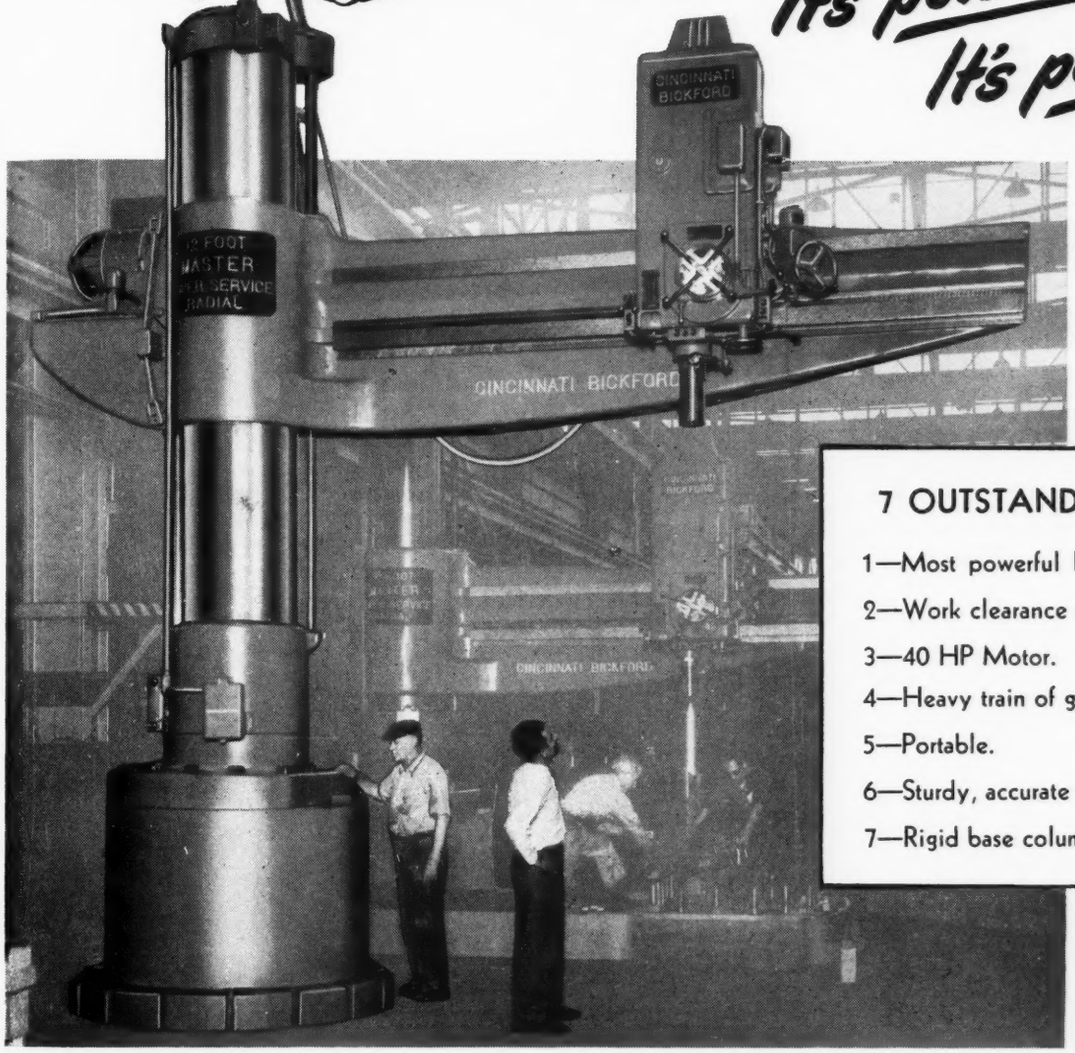


To obtain additional information on equipment described on this page, see lower part of page 202.



with 14' 4" clearance

It's massive— It's powerful— It's portable



7 OUTSTANDING FACTS

1—Most powerful Radial ever built.

2—Work clearance 14' 4".

3—40 HP Motor.

4—Heavy train of gears.

5—Portable.

6—Sturdy, accurate spindle.

7—Rigid base column and arm.

THE CINCINNATI BICKFORD TOOL CO.

RADIAL AND UPRIGHT DRILLING MACHINES

SUPER SERVICE

Radials 7½" dia. col., 2½' arm, to 26" dia. col., 12' arm.
General purpose Uprights, 21" to 28" sizes.
Production Uprights, 21" to 28".
Jig Borers, Portable Horizontals, Spacing Table Machines.

Equal Efficiency of Every Unit Makes the Balanced Machine

To our knowledge the largest and most powerful Radial Drill ever built, this Cincinnati Super Service Master Radial Drill, with a 40 horsepower motor, is being used as a portable machine on very large and heavy work.

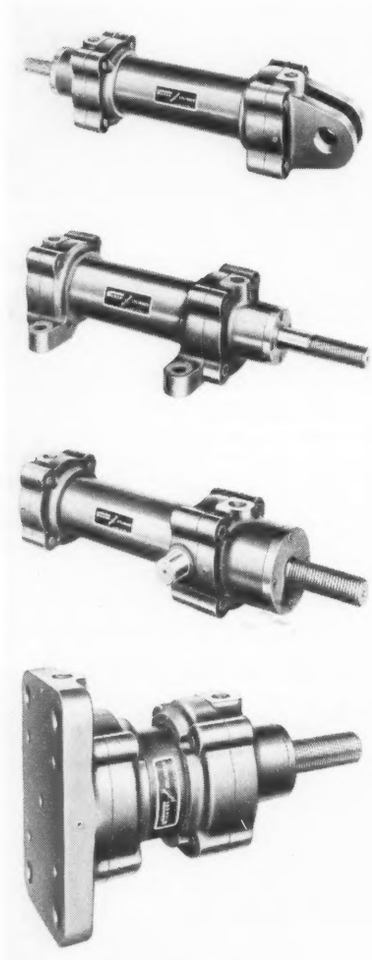
This massive machine, built like a watch, handles easily, and gives continuous, trouble-free service on the heaviest of jobs.

Write for Bulletin R-22 or consult our Engineering Department on your drilling problems.

THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

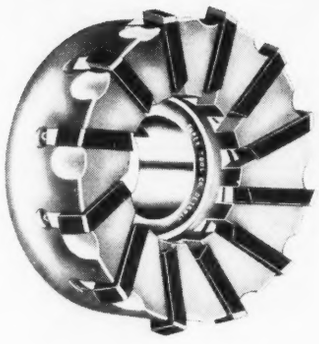
Vickers Hydraulic Cylinders

New line of hydraulic (oil) cylinders for industrial service announced by Vickers, Inc., 1403 Oakman Blvd., Detroit 32, Mich. Features of these cylinders include improved cylinder-head seals; multiple piping connection positions; universal mounting positions; special self-adjusting packings; and adjustable hydraulic cushions. The cylinders are available in twelve standard bore sizes ranging from 1 to 8 inches, and in twelve standard mounting arrangements, which make possible innumerable combinations. Nearly all models can be equipped with either standard or heavy-duty rods. The four models shown (top to bottom) are designed for clevis mounting; foot mounting; trunnion mounting (collar type); and flange mounting (head end). 111



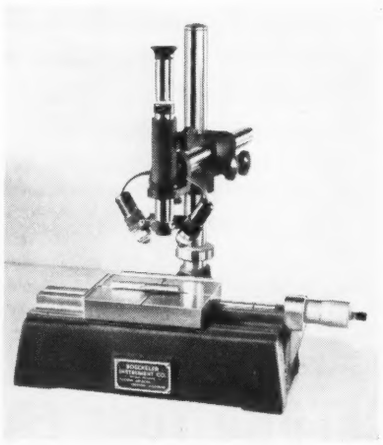
Milling Cutter with Solid Carbide Blades

New type cutter with solid carbide inserted blades for milling cast iron. Developed by the Super Tool Co., 21650 Hoover Road, Detroit 13, Mich. A locking wedge below each blade, actuated by a set-screw, moves the wedge in for locking, and out to permit removal of blade. Blades can be removed without the use of a hammer or chisel. This method of locking permits a greater number of blades to be incorporated in a given size cutter than is possible with side locking wedges. The new design also permits blades to be used down to a length of approximately 1/2 inch, and enables the blades to be moved forward in the direction of the greatest wear. Sizes ranging from 6 inches in diameter with twelve teeth to 14 inches in diameter with twenty-eight teeth are available. 112



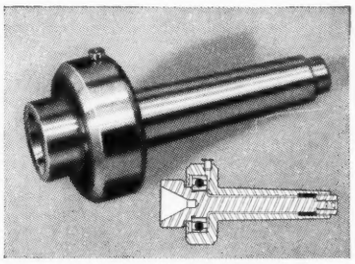
Boeckeler Toolmaker's Microscope

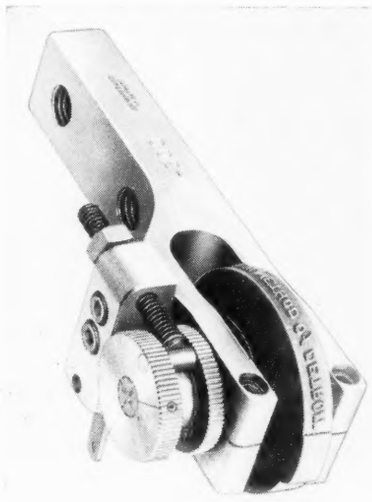
Toolmaker's microscope designed to perform all functions of linear, coordinate, and angular measurements. The range of measurement is 6 1/2 inches. The micrometer head is unusual in that a non-rotating spindle is used. This feature eliminates wear on the stage or gage-rods. The lead-screw with twenty threads per inch permits rapid adjustment and easy accurate reading. Railings positioned at 90 degrees to each other provide for quick accurate location of the work. The over-all magnification is about 32X. Introduced by Boeckeler Instrument Co., 31 E. Rillito St., Tucson, Ariz. 113



Live Center for Centerless Shafts

New female live center designed to support centerless shafts while being turned. Available in two sizes, one with No. 3 Morse taper shank and maximum work capacity of 1 inch, and the other with a No. 2 Morse taper shank and work capacity of 3/4 inch. Both sizes will take work as small as 5/16 inch in diameter. The revolving center is made from electric furnace steel, heat-treated to a hardness of 61 to 65 Rockwell C. The shaft of the center extends through the taper shank of the tool, as shown in the cross-sectional view, and is rigidly supported at both ends. Made by the South Bend Lathe Works, South Bend 22, Ind. ..114





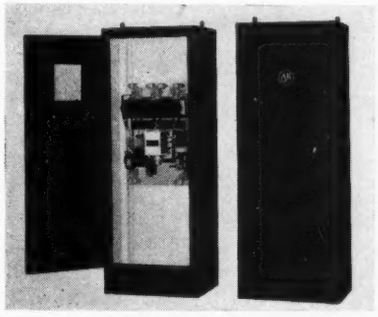
Automatic Roll-Marker for Screw Machines

Automatic parts marker designed for use on all types of automatic and hand-operated screw machines. Eliminates secondary set-ups and handling of parts for marking, and is universally adjustable as to index setting of dies, thus eliminating the need for special drawings of die blanks. Has quickly interchangeable standard rolls which will not score or drag on the part and will produce impressions of uniform depth. Manufactured by New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7, Mich. 115

To obtain additional information on equipment described on this page, see lower part of page 202.

Allen-Bradley Solenoid Starter

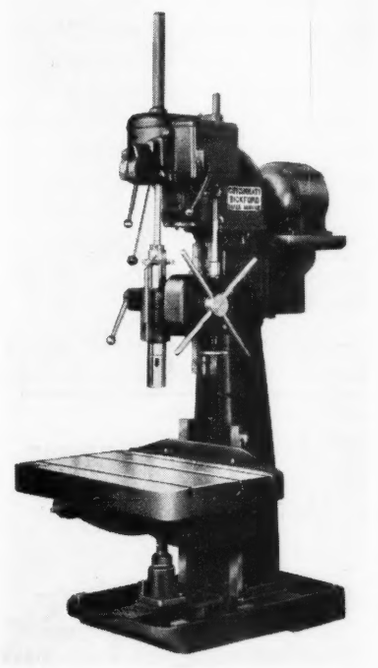
Alternating - current, across - the - line solenoid starter, made in sizes 6 and 7, recently added to the line of 0 to 5 size Bulletin 709 starters of this type made by the Allen-Bradley Co., 1316

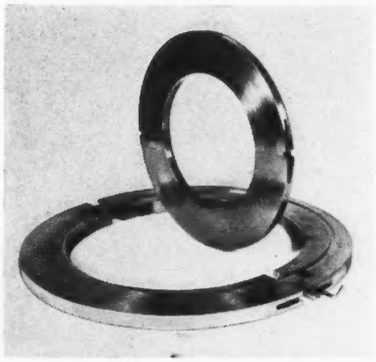


S. Second St., Milwaukee 4, Wis. The size 6 starter has ratings of 600 amperes, 200 H.P., 220 volts; and 400 H.P., 440 to 550 volts. The size 7 has ratings of 900 amperes, 300 H.P., 220 volts; and 600 H.P., 440 to 550 volts. Both units have the one-piece magnetic plunger which operates with a vertical straight-line motion. 116

"Super Service" Drilling Machine with New Box Table

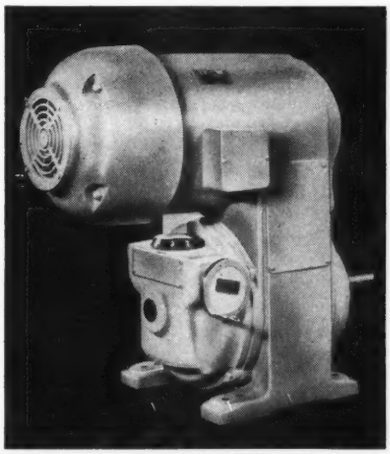
Standard "Super Service" box-column upright metal drilling machine manufactured by the Cincinnati Bickford Tool Co., Oakley, Cincinnati 9, Ohio, equipped with new 24- by 36-inch box table having three milled T-slots. 117





"Sabeco" Split Thrust Washer

Split thrust washer known as the "Sabeco," brought out by the Saginaw Bearing Co., 821 S. Water St., Saginaw, Mich., to facilitate making repairs without dismantling machines or equipment. The two parts of the washer can be easily slipped over the shaft and locked in place with a safety key. Supplied in a variety of regular sizes, as well as in sizes made to suit the customer's specifications. 118

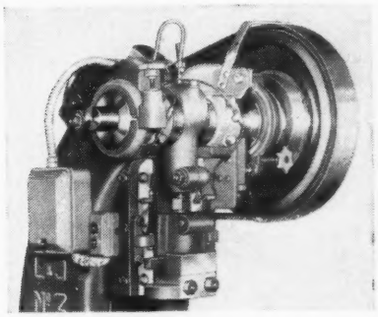


Sterling Variable-Speed Motor Unit

Variable-speed "Speed-Trol" motor-drive unit in "Klosd-Tite Fan-Cooled" design. Announced by Sterling Electric Motors, Inc., Los Angeles, Calif. Cooling is accomplished by forced-draft ventilation through an external fan protected by a streamline cover. Infinite speed adjustment is obtainable through either the finger-tip control on the motor or mechanical, electrical, or lever type controls. 119

New Friction Clutch for L & J Punch Presses

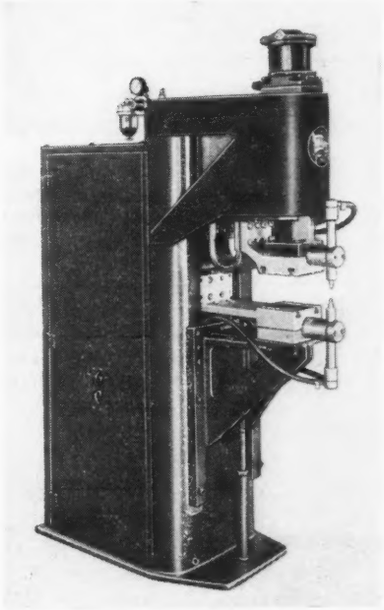
New friction clutch for inclinable punch presses made by the L & J Press Corporation, corner of Ren St. and Sterling Ave., Elkhart, Ind. This clutch has been designed for higher operating speeds, is adjustable to prevent overloading, can be engaged and disengaged at a rapid rate without overheating, and operates with minimum shock. Although compressed-air, hydraulic, or electrical equipment is not required for its operation, any of these sources of actuating



power can be used for control purposes in place of the conventional foot-treadle or hand-levers. 120

Banner Projection Welders

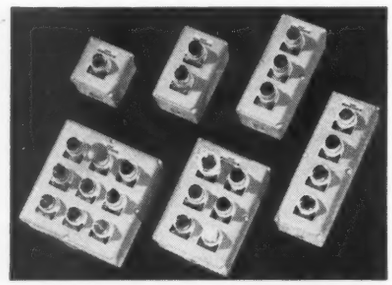
Press type air-operated projection and spot welders now being made by the Banner Mfg. Co., 4934 N. 29th St., Milwaukee, Wis. Built in sizes ranging from 50 to 150 KVA. The roller-head is air-operated and specially designed to assure fast, accurate performance. The quill is guided by eight rollers, mounted on the gib, to assure rigidity and positive alignment, regardless of the stroke length. All air-line equipment is located on top of the unit for easy accessibility. An extra heavy-duty transformer equipped with an eight-stage series parallel heat selector switch assures ample capacity for welding a wide range of metals. 121



To obtain additional information on equipment described on this page, see lower part of page 202.

Westinghouse "Oil-Tite" Control Stations

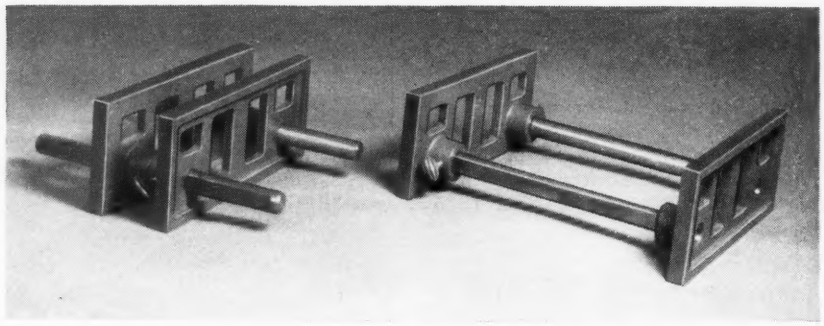
New line of "Oil-Tite" control stations and units available from the Westinghouse Electric Corporation, Box 2099, Pittsburgh 30, Pa. These units are especially designed for use in machine tool control and other heavy-duty installations. A durable resilient gasket provides a positive seal against oil, coolant, cutting compound, and water. The units can be rotated 90, 180, or 270



degrees to enable mounting in any position. Terminals on the contact block are reversible for front and rear connection, and provide a wide variety of contact arrangements to meet complex control requirements. 122

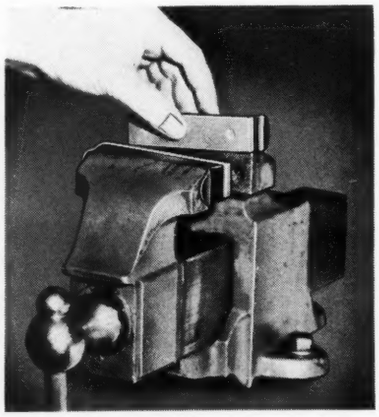
"Clipper" False Jaws for Bench Vise

False jaws with fiber pad faces that can be quickly snapped into place on the regular steel jaws of a vise to prevent the marring of delicate finishes or plated surfaces. The composition fiber faces will not crack, dent, or break under ordinary clamping pressures, and are secured to the spring steel backs that serve to hold them in place. They are made to fit all vises with 3- to 6-inch jaws. Placed on the market by the Johnson Machine Works, 617-619 Menomonie St., Eau Claire, Wis. 123



Adjustable Parallels for Tool and Die Work

Adjustable parallels designed to facilitate holding tools, dies, and fixtures for all kinds of tool-room work, including drilling, tapping, grinding, assembling, checking, etc. Made in three sizes having lengths of 10, 12, and 18 inches. The smallest size is 4 inches high, and is adjustable sideways from 3 1/4 to 11 1/4 inches. The two larger sizes are each 6 inches high, and are adjustable from 3 3/4 to 13 1/2 inches and from 4 to 20 inches, respectively. Distributed by Tinker's Thread Grinder Co., 169 Granby Road, South Hadley Falls, Mass. 124



Program for "Selling" the American Economic System

A program by which industrial and business firms can "sell" the American economic system to employes, schools, and community groups through the use of colored sound slide films, has been developed by Ross Roy, Inc., 2751 E. Jefferson Ave., Detroit 7, Mich., national advertising agency.

The program includes a series of films, each of which is a complete story in itself, explaining the fundamentals of the American economic system and its advantages. They are written in an easily understood manner and are based on historical fact, showing the constant struggle for freedom that has been going on throughout history. In addition to the six films in the series, there are records and booklets reviewing each film.

It is stated that unless a better understanding is developed of the values and responsibilities inherent in the American way of life, we may all encounter difficulties in maintaining our liberties in the future.

To Obtain Additional Information on Shop Equipment

Which of the new or improved equipment described in this section is likely to prove advantageous in your shop? To obtain additional information or catalogues about such equipment, fill in below the identifying number found at the end of each description—or write directly to the manufacturer, mentioning machine as described in March, 1950, MACHINERY.

No.	No.	No.	No.	No.	No.	No.	No.	No.	No.

Fill in your name and address on blank below. Detach and mail within three months of the date of this issue to MACHINERY, 148 Lafayette Street, New York 13, N. Y.

NAME..... **POSITION OR TITLE**.....

[This service is for those in charge of shop and engineering work in manufacturing plants.]

FIRM.....

BUSINESS ADDRESS.....

CITY..... **STATE**.....



FASTER GRINDING — FEWER WHEEL DRESSINGS — LOWER COSTS

Economies gained by a New England plant* using TEXACO SOLUBLE OIL

In this spindle grinding operation, an emulsion of *Texaco Soluble Oil D* is far out-performing the previously used high-priced competitive coolant. This is shown by a comparative run in which the same number of pieces was ground with each lubricant in turn.

Throughout the test, the wheel protected by the *Texaco Soluble Oil* emulsion required no dressing at all. Wheel size and corners were adequately maintained. With the competitive coolant, wear and corner breakdown sufficient to require wheel dressing occurred before half the run was completed.

In addition, *Texaco Soluble Oil* kept the wheel open, assuring faster cutting and better finish, and considerably reduced the total time for the run.

Examples like this of lower cost machining are the rule when *Texaco Cutting, Grinding and Soluble Oils* are on the job. A Texaco Lubrication Engineer will gladly help you gain these same benefits in your plant—whatever your metal working operations. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Operation: Grinding spindles to remove .020" stock
Metal: 4150 steel, hardened to 40-45 Rockwell
Machine: Cincinnati Filmatic, 10" cylindrical grinder
Emulsion: Texaco Soluble Oil D at 58:1

**Name of this Texaco user on request*

TEXACO

TEXACO CUTTING, GRINDING AND SOLUBLE OILS FOR FASTER MACHINING

TUNE IN . . . TEXACO presents MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

New Trade Literature

RECENT PUBLICATIONS ON MACHINE SHOP EQUIPMENT, UNIT PARTS, AND MATERIALS

To Obtain Copies, Fill in on Form at Bottom of Page 208 the Identifying Number at End of Descriptive Paragraph, or Write Directly to Manufacturer, Mentioning Catalogue Described in the March, 1950, Number of MACHINERY

Hydraulic Tables

BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa. Bulletin 300, containing 36 pages of data for designers and users of hydraulic equipment, including capacities of hydraulic rams, displacements of single-acting plungers, steel pipe tables, friction losses of fittings, bolt strength and size, etc. Information is also given on strength of structural materials, properties of sections, beam formulas, coil spring design, and many other subjects. Those interested in equipment of this type can obtain copies by requesting them on a company letter-head, directed to the Baldwin Locomotive Works.

Hydraulic Equipment

HANNIFIN CORPORATION, 1110 S. Kilbourn Ave., Chicago 24, Ill. Bulletin 150, entitled "Hy-Power Hydraulics," describing the application of the Hannifin "Hy-Power" hydraulic pressure system for a wide range of high-speed production operations, including silent-squeeze riveting, punching, and pressing. Data on the hydraulic cylinders and a detailed description of the generator are given, together with diagrams. Production engineers and machine and tool designers can obtain copies by sending a request to the company at the address given above.

Rust Protection by Galvanizing

ST. JOSEPH LEAD CO., 250 Park Ave., New York 17, N. Y. Booklet containing information of interest to producers and fabricators of galvanized products on the general subject of galvanizing in the metal-working industries, and the use of St. Joe electrothermic zinc for preventing iron and steel products from rusting. Copies will be sent to those interested if requested on a company letter-head directed to the St. Joseph Lead Co.

Aluminum Extrusion Handbook

REYNOLDS METALS CO., 2500 S. 3rd St., Louisville 1, Ky. Publication entitled "Designing with Aluminum Extrusions," containing 138 pages of information on the use of extruded aluminum shapes in design, including many examples of specific applications. Copies are available without charge to engineers, designers, architects, and others requesting them on a company letter-head addressed directly to the Reynolds Metals Co.

Fan and Pump Ball Bearings

MARLIN - ROCKWELL CORPORATION, Jamestown, N. Y. Catalogue containing fourteen drawings showing applications of double-row ball bearings designed for fan and water pump units in automotive applications and other uses where it is impractical to use two single-row bearings. Copies will be sent to those interested if requested on a company letter-head addressed to the Marlin-Rockwell Corporation.

Carbide and Cast-Alloy Products

VASCOLOY-RAMET CORPORATION, 800 Market St., Waukegan, Ill. Catalogue VR-440, containing 92 pages of information on carbide and cast-alloy products, indexed and color tabbed for easy reference. This book serves as a complete buyer's guide, and includes a table showing ten standard grades of carbides, with information on the proper grade to use for various machining operations and kinds of materials. 1

Fuels and Lubricants for Diesel Engines

SINCLAIR REFINING CO., 630 Fifth Ave., New York 20, N. Y. Booklet entitled, "Diesel Engines —Fuels and Lubricants," describing the construction of the Diesel engine and giving a fund of valuable information on its proper lubrication, together with data on the capabilities and performance of specialized fuels, lubricants, and additives. 2

Cutting Tools and Broaches

CONTINENTAL TOOL WORKS, DIVISION EX-CELL-O CORPORATION, 1200 Oakman Blvd., Detroit 32, Mich. Catalogue 60681, containing 136 pages of data on Continental standard carbide and high-speed steel cutting tools, special tools, and broaches. Useful information and charts are included, arranged for ready reference. 3

Herringbone Speed Reducers

D. O. JAMES GEAR MFG. CO., 1140 W. Monroe St., Chicago 7, Ill. Catalogue 40-B, containing 48 pages covering continuous-tooth herringbone-gear speed reducers having ratio ranges of from 2 to 360 to 1, with capacities up to 3500 H.P. Rating tables, together with simplified methods of selecting the proper drive, are included. 4

Universal Die-Casting Machine

CLEVELAND AUTOMATIC MACHINE CO., Cincinnati 12, Ohio. Bulletin illustrating and describing the design and construction features of the Model 50 Cleveland universal high-pressure hydraulic die-casting machine, which can be furnished either in the gooseneck or in the cold-chamber type. 5

Abrasive-Belt Grinding and Polishing

MINNESOTA MINING & MFG. CO., 900 Fanquier St., St. Paul 6, Minn. Booklet entitled "Step Up Production with the 3M Method of Grinding and Finishing," containing 36 pages of case histories and technical data on grinding and polishing with abrasive belts, covering a variety of materials. 6

Anti-Friction Bearing Installation and Maintenance

ANTI-FRICTION BEARING DISTRIBUTORS' ASSOCIATION, 1900 Euclid Bldg., Cleveland 15, Ohio. Booklet entitled "Installation, Maintenance, Removal of Anti-Friction Bearings," containing comprehensive information on the subject of bearing care, including cleaning and lubrication. 7

Rust-Preventive Oil

OAKITE PRODUCTS, INC., 26 Thames St., New York 6, N. Y. Booklet containing descriptive data on Oakite special protective oil, designed to give semi-permanent protection from rust to metal parts during production, in storage, or while awaiting shipment. 8

Hole Punching and Notching System

WALES - STRIPPIT CORPORATION, 375 Payne Ave., North Tonawanda, N. Y. Bulletin 7, describing Wales hole punching and notching units, designed for the rapid perforating of sheet metal in fabricating television, radar, and radio equipment. 9

Investment Casting Alloys

PRECISION METALSMITHS, INC., 6511 Cedar Ave., Cleveland 3, Ohio. Manual of data sheets giving the chemical composition, essential mechanical and physical properties, heat-treatment, and other information on eighty alloys that have been precision-cast by this concern. 10

"Preventive Maintenance" Records

ACME VISIBLE RECORDS, INC., 122 S. Michigan Ave., Chicago 3, Ill. Bulletin entitled "Preventive Maintenance," describing a system for periodic inspection of machines employed at the Link-Belt Co., in which use is made of Acme visible records. 11

Light Machinery Drives

CONGRESS DRIVES DIVISION, TANN CORPORATION, 3750 East Outer Drive, Detroit 34, Mich. Catalogue CD 300A, containing dimensional data and prices for Congress pillow blocks, pulleys, flexible couplings, and V-belt clutches. Design data are included. 12

Hydraulic Cylinders

VICKERS, INC., 1403 Oakman Blvd., Detroit 32, Mich. Bulletin 49-55, containing complete information on the line of Vickers hydraulic (oil) cylinders, which are made in a wide variety of styles and sizes. Engineering data included. 13

Bronze Bars

AMERICAN BRAKE SHOE CO., NATIONAL BEARING DIVISION, 4930 Manchester Ave., St. Louis 10, Mo. Bulletin listing sizes and weights of the expanded line of "Tiger" cored and solid, shock-resistant, anti-frictional bronze bars. 14

Electrically Operated Cutting Tool

NORD INTERNATIONAL CORPORATION, 130 Greenwich St., New York 6, N. Y. Leaflet illustrating and describing the "Nibblex" portable electrically operated cutting tool suitable for automobile body repairs and other sheet-metal work. 15

Automatic Roll-Marking Tools

NEW METHOD STEEL STAMPS, INC., 147 Jos. Campau, Detroit 7, Mich. Bulletin NM-49, descriptive of the features and applications of a new line of automatic roll-marking tools for screw machines, including drawings showing different methods of set-up. 16

Right-Angle Gear Units

AIRBORNE ACCESSORIES CORPORATION, 25 Montgomery St., Hillside 5, N. J. Catalogue descriptive of the company's improved model "Anglgear," a right-angle gear unit with universal mounting, suitable for manual- or power-operated drives in aircraft and industrial applications. 17

Plastic Extrusion

TENNESSEE EASTMAN CORPORATION, Kingsport, Tenn. Booklet containing technical information on the continuous extrusion of Tenite plastic in various forms, together with a suggested guide for correcting extrusion difficulties. 18

Small Motor Selector

WESTINGHOUSE ELECTRIC CORPORATION, Box 2099, Pittsburgh 30, Pa. Booklet B-3075-C, containing charts and data designed to aid the user in selecting the particular fractional - horsepower motor suitable for any specific application. 19

Inclinable Presses

FEDERAL MACHINE & WELDER CO., Warren, Ohio. Bulletin OBI, illustrating the Warco line of high-speed, precision-production, open-back, inclinable presses. Complete specifications and other useful data are included. 20

Multiple-Spindle Drilling and Tapping Heads

ETTCO TOOL CO., INC., 594 Johnson Ave., Brooklyn 6, N. Y. Bulletin 33, describing the new Ettco-Emrick convertible adjustable-spindle multiple heads applicable for both drilling and tapping. 21

Portable Hardness Testers

R. Y. FERNER CO., INC., 110 Pleasant St., Boston 48, Mass. Bulletins descriptive of improved portable models of Brinell testing instruments for testing the hardness of metals and plastics by the static and dynamic methods. 22

Measuring Surface Roughness

PHYSICISTS RESEARCH CO., 321 S. Main St., Ann Arbor, Mich. Illustrated bulletin describing the advantages and operating features of the Profilometer for shop measurement of surface roughness. 23

Electronic Welding Control Equipment

WESTINGHOUSE ELECTRIC CORPORATION, P.O. Box 2099, Pittsburgh 30, Pa. Booklet B-4309, describing in detail Westinghouse new electronic resistance welding control equipment. 24

Power Driver

MINE SAFETY APPLIANCES Co., Braddock, Thomas, and Meade Sts., Pittsburgh 8, Pa. Bulletin TA-17, descriptive of the MSA velocity power driver for driving steel studs into steel, concrete, or masonry. 25

Salt Baths for Heat-Treating

HEATBATH CORPORATION, Box 78, Springfield, Mass. Technical data sheets describing the Heatbath line of salt baths for the heat-treatment and finishing of metals, including two new baths for heavy-duty liquid carburizing. 26

Liquid-Line Filters

MARVEL ENGINEERING Co., 625 W. Jackson Blvd., Chicago 6, Ill. Bulletin descriptive of the Marvel liquid-line synclinal filter designed to meet a wide variety of applications in the filtration of non-corrosive liquids. 27

"Tri-Clad" Synchronous Generators

GENERAL ELECTRIC Co., Schenectady 5, N. Y. Bulletin GEA-5415, on "Tri-Clad" high-speed synchronous generators suitable for standby, portable, and prime-source power. 28

Bronze Bearings

JOHNSON BRONZE Co., 520 S. Mill St., New Castle, Pa. Catalogue 500, covering the complete line of Johnson bronze industrial bearings and bushings, including several newly developed electric motor bearings. 29

Worm-Gear Speed Reducers

CLEVELAND WORM & GEAR Co., 3276 E. 80th St., Cleveland 4, Ohio. Bulletin 125, containing complete data on the new Cleveland Types NU and ND vertical worm-gear speed reducers. 30

Lincoln Electric Service Directory

LINCOLN ELECTRIC Co., Cleveland 1, Ohio. Directory of the 146 field service shops of the company, and complete price list for exchange welder part. 31

Aluminum Casting Alloys

FEDERATED METALS DIVISION, AMERICAN SMELTING & REFINING Co., 120 Broadway, New York 5, N. Y. Booklet on aluminum casting alloys, treating of the metallurgy, specifications, and foundry practices. 32

Pre-Finished Metals

AMERICAN NICKELOID Co., Peru, Ill. Folder containing data on the characteristics of pre-finished metals of value to manufacturers and product designers. 33

Electrical Meters

MARION ELECTRICAL INSTRUMENT Co., Manchester, N. H. Bulletin descriptive of the new Marion "ruggedized" hermetically sealed electrical meter. 34

Cold-Finished Special Shapes

ALLOY METAL WIRE Co., INC., Prospect Park, Pa. Leaflet containing data on Almet cold-finished flat wire and precision-rolled strip. 35

Wet Tool Grinder

BOICE-CRANE Co., 930 Central Ave., Toledo 6, Ohio. Folder on the "Friction-matic" wet tool grinder with self-adjusting friction roll drive. 36

Explosion-Proof Motors

RELIANCE ELECTRIC & ENGINEERING Co., 1111 Ivanhoe Road, Cleveland 10, Ohio. Bulletin C-130, on explosion-proof motors ranging from 3/4 to 125 H.P. 37

Bliss Press Deferred Payment Plan

E. W. BLISS Co., Toledo 7, Ohio. Booklet describing the details of the Bliss power press deferred payment plan. 38

Portable Pneumatic and Electric Tools

ROTOR TOOL Co., 17325 Euclid Ave., Cleveland 12, Ohio. Pamphlet entitled "How to Choose and Use Portable Tools." 39

Protective Coatings

ATLAS MINERAL PRODUCTS Co., Mertztown, Pa. Bulletin 7-1, containing information on corrosion-proof coatings for protecting steel, concrete, and wood. 40

To Obtain Copies of New Trade Literature

listed in this section (without charge or obligation), fill in below the publications wanted, using the identifying number at the end of each descriptive paragraph; detach and mail within three months of the date of this issue (March, 1950) to MACHINERY, 148 Lafayette Street, New York 13, N. Y.

No.	No.	No.	No.	No.	No.	No.	No.	No.	No.

NAME..... POSITION OR TITLE.....

[This service is for those in charge of shop and engineering work in manufacturing plants.]

FIRM.....

BUSINESS ADDRESS.....

CITY..... STATE.....



By E. S. Salichs

BETWEEN GRINDS

An Eternal Customer

A professor of industrial administration at Waseda University, Shinjuku-ku, Tokyo, Japan, interested in the study of industrial engineering, has requested our book catalogue, ending his letter: "And please inform me the book lists when you publish the new books. I sincerely ask you to keep the intimacy forever."

Lifting a Few Lines

Commenting on the N.M.T.B.A. booklet "Computing Return on Invested Capital (see resume in February MACHINERY, page 196), Tell Berna, General Manager of the Association writes to us: "We are very happy about the reaction we have had in the distribution of this booklet. Everybody likes the simplicity of it and while here and there people feel that a more scientific approach can be made in the computation of the returns to be earned by a new machine, we know from painful experience that when you try to get too scientific, you get into water that is too deep for your customer and he just won't play."

If Controls are Tight Can the Price be Right?

A letter received from a country in Europe began: "As our Foreign Currency Department is very avaricious, please state your wholesale price on 'Machine Shop Training Course,' and 'Machine Tools at Work'."

Laurel for a Lady

Stevens Institute of Technology for the first time awarded a woman an honorary degree of doctor of engineering, at midwinter commencement. Dr. Lillian M. Gilbreth, management engineer, was the recipient. Bringing up a family of twelve children on engineering principles (reference: "Cheaper by the Dozen") undoubtedly fortified Dr. Gilbreth in the pursuance of her successful career.

Mr. Sears, We're in Tears

From G. W. Sears of Cincinnati, Ohio: "I am retiring this year, so I am canceling my more than twenty-five years of subscription to MACHINERY, which was a great help in keeping me up to date with improvements and advancement of the trade and other information." It's sorry we are to lose such a loyal subscriber.

Now He Has Only One Problem

A correspondent who describes himself as "an old U. S. Steel draftsman" is concerned with two problems: (a) his Central Ohio community of 3300 people has no lathe-miller-shaper machine shop; and (b) the local high school has no mechanical instructor. The solution as he sees it is simple: Find a qualified machinist who would like to open a shop in the town and teach in the school on a part-time basis.

Keep Your Eye Open for the Philadelphia Story—April MACHINERY.

A BOWMAN AND HIS MARK—"Born and raised" in Maryland, Henry R. Bowman attended public and polytechnic schools; his aim in engineering fixed, he took correspondence courses in mechanical, electrical, steam and structural engineering. Mr. Bowman gravitated into government positions, his first being that of draftsman in the gun division of the War Department in Washington, D. C., where he gained valuable experience in the application of mathematics to high-grade machine design. Thence to the Watervliet Arsenal, Watervliet, N. Y. Later he switched to the Navy Department's Bureau of Steam Engineering. Sampling



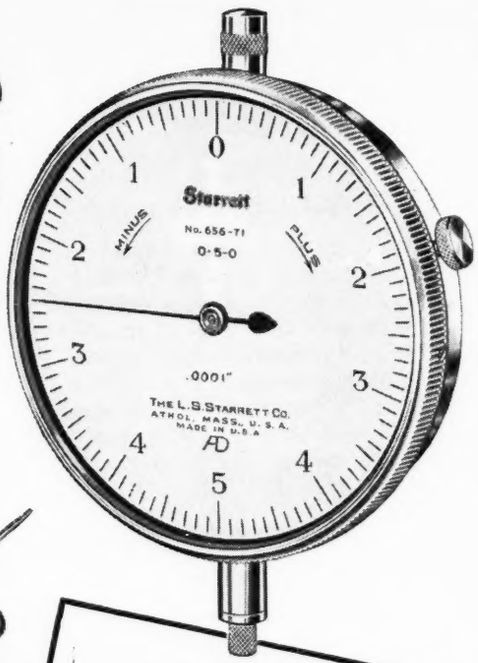
private enterprise, Mr. Bowman joined the Poole Engineering Co., Woodberry, Md., as ordnance expert. For a year and a half he was assistant structural engineer for the City of Baltimore, and now he is back in industry as a designing engineer for the Crown Cork & Seal Co. of Baltimore. Mr. Bowman believes in activity during his leisure hours, exercising in the Y gym, swimming in the pool, shooting on the target range, hiking, and the like. But he reserves enough energy for writing technical articles—two of which appear in this issue, on pages 165 and 170. And then he settles down to crossword puzzles to finish out his evenings.

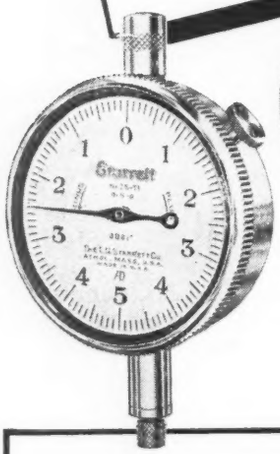
Now More ADAPTABLE Than Ever TO ANY GAGING JOB

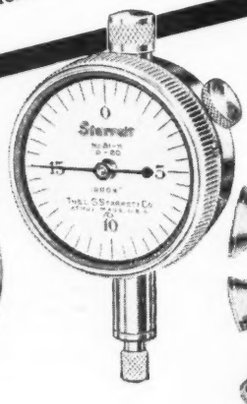
EASY TO CHOOSE
STARRETT PRECISION DIAL INDICATORS

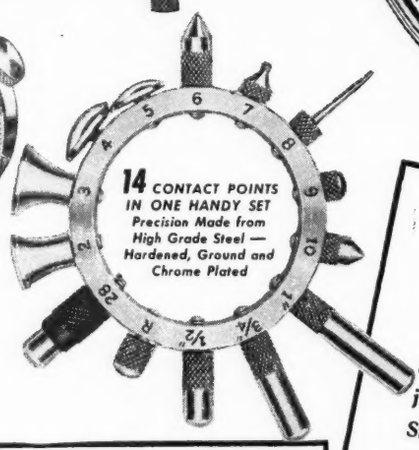
Made to American Gage Design Specifications in four series and over 54 types for production inspection applications and for mounting on machine tools, production jigs and fixtures. The precision line for all quality control applications.











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STARRETT DIAL INDICATOR POINT SELECTOR

Select the right contact for any job from this new, handy set of Starrett dial indicator contact points. 14 points including 9 special forms and a patented shock absorbing point — all mounted for quick selection and safekeeping on a light, convenient aluminum ring.

FREE! 3 USEFUL AIDS



Starrett Dial Indicator Catalog Illustrates the complete line with specifications, useful data and prices

Starrett Transfer Chart Trace instantly to full scale any Starrett AGD Dial Indicator

Starrett Physical Dimension Chart Complete dimensions for all Starrett Dial Indicators and Contact Points





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THE L. S. STARRETT CO. . *World's Greatest Toolmakers* . ATHOL, MASSACHUSETTS · U. S. A.

News of the Industry

Connecticut and New Hampshire



John H. Baninger assistant chief engineer of General Motors New Departure Division, whose retirement has just been announced

JOHN H. BANINGER, assistant chief engineer of the New Departure Division, General Motors Corporation, Bristol, Conn., retired on January 31. Mr. Baninger is a recognized authority on ball-bearing applications, particularly in the machine tool field. He had been connected with the company since November 1, 1926. Mr. Baninger plans an extended vacation in the South, but will continue to make his permanent home in Bristol, Conn.

E. K. BROWN, formerly chief engineer of the Needle Bearings Division of the Torrington Co., Torrington, Conn., has been appointed director of research for the company. B. T. VIRTUE succeeds Mr. Brown as chief engineer.

HARTFORD SPECIAL MACHINERY CO., Hartford 5, Conn., manufacturer of automatic drilling and tapping machines, thread rolling machines, and die polishing machines, announces the appointment of the following representatives: WOODALL ENGINEERING & SALES CO., 910 Winters Bank Bldg., Dayton 2, Ohio; MCBETH MACHINERY CO., 330 Grant St., 1109 Grant Bldg., Pittsburgh 19, Pa.; GARCO MACHINERY CO., 7702 Carnegie Ave., Cleveland 3, Ohio; RAY H. FARMER CO., 8749 Grand River Ave., Detroit 4, Mich.; and LUTHER & PEDERSEN, INC., 565 West Washington Blvd., Chicago 6, Ill.

BRIDGEPORT BRASS CO., Bridgeport, Conn., announces the opening of a new district sales office in the Reserve Life Building, Dallas, Tex. The new office will be under the direction of B. M. NEILSON, district manager.

CHARLES I. GEDDES has been named sales engineer for the Rollins Engine Co., Nashua, N. H., designer and builder of special machinery and machine tools. He was formerly chief engineer of the A. S. Campbell Co., Boston, Mass. Mr. Geddes will represent the Rollins Engine Co. throughout New England.

WILLIAMS & HUSSEY MACHINE CO., Wilton, N. H., who recently purchased the O. K. TOOL CO. of Shelton, Conn., announces that the offices and plant of that company have been moved from Shelton to Wilton.

Illinois

H. WALTER REGENSBURGER has been made chief engineer of the general engineering department of the Link-Belt Co., Chicago, Ill., succeeding HARRY L. STRUBE, who has retired after many years of service in sales and executive engineering capacities. At the same time, it is announced that the general engineering department has been transferred from Philadelphia to 301 W. Pershing Road, Chicago, Ill. Assisting Mr. Regensburger will be CHARLES M. YOUNG, JR., as chief developmental engineer, and HAROLD F. WATSON as chief standards engineer.

G. R. CARRIER, 1815 W. 95th St., Chicago, Ill., has been appointed representative in the Chicago and northern Illinois territory for the line of air and hydraulic cylinders and special machinery built by the HYDRO-LINE MFG. CO., Rockford, Ill.

P. H. MCMANUS has been made general sales manager of Templeton, Kenly & Co., Chicago, Ill., manufacturer of Simplex jacks.

Massachusetts

HARRY E. MASTERS has been made educational director, in charge of all vocational education and industrial apprentice training programs and activities, as well as trade shows and conventions, for the L. S. Starrett Co., Athol, Mass. Mr. Masters brings to his new position more than forty years of experience in sales, educational work, and advertising, the last twenty of which he served as advertising manager. C. G. NORDMARK will replace Mr. Masters as advertising manager. He formerly held a similar position with the Lord Mfg. Co. of





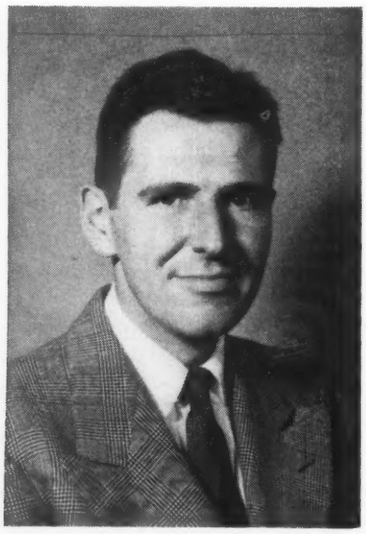
(Left) Harry E. Masters, recently appointed educational director of the L. S. Starrett Co. (Right) C. G. Nordmark, who succeeds Mr. Masters as advertising manager

Erie, Pa., and had also served as assistant publicity director of the Heald Machine Co., Worcester, Mass.

RIVETT LATHE & GRINDER, INC., Boston, Mass., announces the purchase of the entire line of air and hydraulic valves, cylinders, and hydraulic power units made by the Gerotor May Corporation, Baltimore, Md. All manufacturing and selling operations have been transferred to Boston. The Gerotor May Corporation will continue the manufacture and sale of Gerotor hydraulic pumps and fluid motors at Baltimore, Md. JOHN A. MARSH, formerly special sales representative for the Gerotor May Corporation, has been made sales manager for the Rivett valve and cylinder division.

NORTON CO., Worcester, Mass., announces the following changes in its sales department: WILLIAM C HOWARD, formerly field engineer in the Hartford, Conn., area, has been named abrasive engineer, with headquarters in New Haven, Conn., replacing J. LAWRENCE TOBEY, who recently resigned. JOHN W. MCCUE, F. DONALD WING, and JOHN W. WHEELER have been appointed field engineers. Mr. McCue and Mr. Wing will be located at the Chicago office, and Mr. Wheeler will succeed Mr. Howard at Hartford.

JOHN C. EWER, abrasive engineer with the Norton Co. in the Boston district, has been appointed assistant general manager of the Norton Grinding Wheel Co., Ltd., which is a branch plant of the company in Welwyn Garden City, Herts, England. Mr. Ewer will leave for England to take over his new responsibilities about May 1. RAYMOND J. FORKEY, abrasive engineer in Rochester, N. Y., will take over Mr. Ewer's district.



John C. Ewer, assistant general manager of the Norton plant in England

EDWARD BLAKE CO., 437 Cherry St., West Newton 65, Mass., manufacturer of tap-sharpening machines, has established a tap servicing department where manufacturers who are not equipped with tap-sharpening machines can have their taps properly sharpened. The purpose of the department is not to salvage worn-out tools, but to prolong the life of tools by precision sharpening.

CHARLES W. COFFIN has been appointed sales manager of the Reed-Prentice Corporation, Worcester, Mass., and J. D. SHERMAN has been named sales engineer at the New York office. Mr. Sherman was formerly connected with the Norton Co., Worcester, Mass.

MILTON F. BEECHER was elected vice-president in charge of research and development of the Norton Co., Worcester, Mass., at a recent meeting of the stockholders. Mr. Beecher had been director of research since 1941.

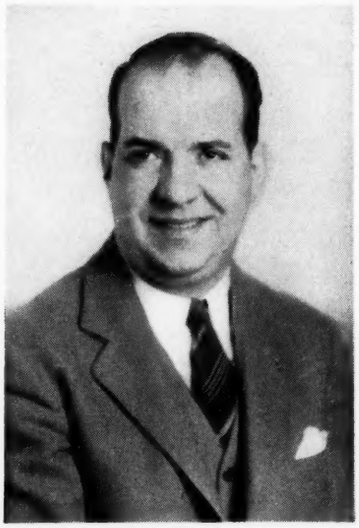
Michigan and Wisconsin

FOX ENGINEERING CO., Jackson, Mich., manufacturer of multiple-spindle drilling and tapping machines and hydraulic presses, has appointed E. J. EDSON, 1405 Hoyt St., Muskegon Heights, Mich., exclusive representative of the company in the western Michigan territory. The BERT CARPENTER Co., who has been acting as exclusive dealer for the entire state during the last four years, will continue to represent the company in eastern Michigan.

ROTO-FINISH CO. announces that it has recently moved into a new factory at Kalamazoo, Mich. A feature of this plant is the new sample processing department where all models of the company's equipment are used to demonstrate Roto-Finish processes under conditions as nearly as possible like those in actual plant production. An experimental laboratory is also maintained for development work.

MARQUETTE MACHINERY CO., dealer in used metal-working machinery, has recently moved into its own building at 13201 Prospect Ave., Dearborn, Mich. The new building has a floor area of 13,000 square feet, an additional 8000 square feet for storage being provided in an adjacent building. The plant is equipped with 100-H.P. electrical service, so that machines can be demonstrated in operation on the floor.

J. F. LACCHIA, 516 Meadowlawn Road, East Lansing, Mich., has been appointed sales engineer in the Michigan territory for the Cleveland Punch & Shear Works Co., Cleveland, Ohio. Mr. Lacchia was connected for twenty-six years with the E. W. Bliss Co., serving in various executive capacities. During the last nineteen years, he had been assigned to the Michigan territory.



J. F. Lacchia, Michigan sales engineer for the Cleveland Punch & Shear Works Co.

HOLLIS H. MOSHER has been named sales engineer for the Illinois Tool Works, Chicago, Ill., manufacturer of metal-cutting tools. Mr. Mosher will be located at the Detroit sales office, 2895 E. Grand Blvd. He was formerly connected with the sales office in this district of the Firth-Sterling Steel Co., McKeesport, Pa.

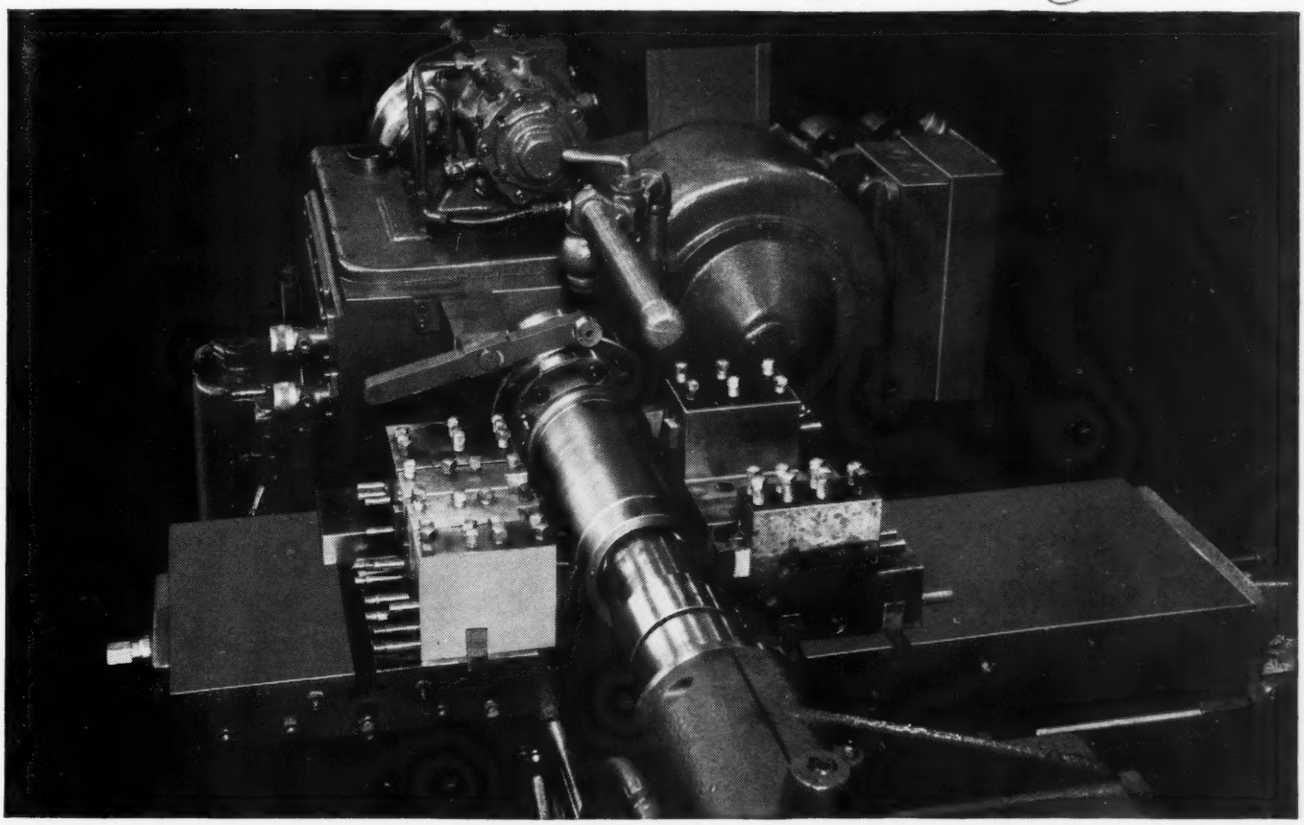
GEORGE L. CARR, for the last thirteen years connected with the Apex Broach Co., Detroit, Mich., has resigned as vice-president and sales manager of that company and has joined the Colonial Broach Co. of Detroit, as assistant to the sales manager, in charge of estimating.

H. L. WHITMER has been made master mechanic of the General Motors Chevrolet-Saginaw Transmission Plant at Saginaw, Mich. He has assumed the duties formerly held by W. R. SMITH, who retired recently. E. A. CARLSON will fill the position of general foreman.

ROBERT N. HENDRICKSON has been appointed vice-president in charge of sales engineering of the Huck Mfg. Co., Detroit, Mich.

STOLPER STEEL PRODUCTS CORPORATION, Milwaukee, Wis., manufacturer of sheet-metal parts and assemblies for automotive, industrial, and agricultural use, announces its removal to a new factory at Menomonee Falls, Wis., a Milwaukee suburb. The new plant, which is expected to be completed before the end of this year, will comprise a one-story factory building containing 130,000 square feet.

CYLINDER LINERS:



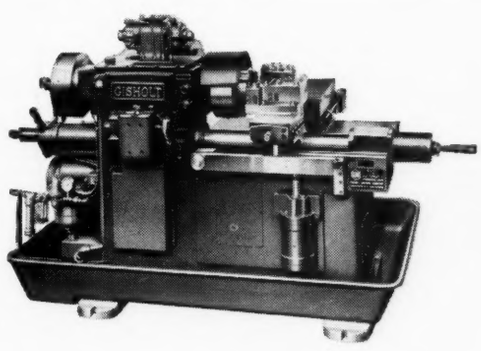
17 different sizes on One Automatic Lathe

THE GISHOLT No. 12 HYDRAULIC

You wouldn't expect an automatic lathe to handle such a wide variety of work as this—unless you know the Gisholt No. 12 Hydraulic.

This versatile automatic lathe handles 17 different sizes of cylinder liners ranging from 6½″ to 13″ in length and from 3″ to 5″ in diameter. The work is chucked on expanding arbors with interchangeable pads, while the front and rear tooling is mounted in standard, interchangeable tool blocks. This arrangement provides exceptional flexibility and a facility to quickly change over from one job to another.

When you can handle as many different sizes of parts on *one* automatic lathe—and cut both machining and set-up time—you're *bound* to cut your costs.



GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

Gisholt No. 12 Hydraulic Automatic Lathe—a rugged 12″ lathe that combines speed and accuracy with easy set-up — unique among automatics.

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*



GISHOLT

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

New Jersey

JAMES P. STEWART, vice-president and manager of the Commercial Sales Division for the De Laval Steam Turbine Co., East Trenton, N. J., has been elected executive vice-president. W. A. REYNOLDS, manager of the IMO-De Laval Products Division, has been appointed assistant to the president, and W. A. NEUMANN, JR., controller of the company, has been made acting manager.

RIVERSIDE METAL CO., Riverside, N. J., producer of copper alloys, announces the establishment of new district sales offices in Detroit, Mich., and Rochester, N. Y. The company has also appointed the following sales agents: Edgcomb Steel Corporation; J. M. Tull Metal & Supply Co.; Alaskan Copper & Brass Co.; and Metal Goods Corporation.

TAFT-PEIRCE MFG. CO., Woonsocket, R. I., has appointed GEORGE M. PEARSE & Co., 1060 Broad St., Newark, N. J., representative in the New Jersey and metropolitan New York area for the company's line of gages, gage-blocks, small tools, and toolroom and inspection equipment.

FRED M. SHELLEY, JR., has recently been appointed general sales manager of the Riverside Metal Co., Riverside, N. J., producer of nickel-silvers, phosphor-bronzes, and beryllium copper. ALFRED G. DENNISON will hold the position of assistant general sales manager.

GEORGE H. HODAPP has been elected president of Heller Brothers Company, Newark, N. J., manufacturer of files, hammers, and other hand tools. JAMES G. HENRY, JR., has been elected vice-president and secretary.

New York

WILBUR J. KUPFRIAN, part owner and engineering director of the Elliott Mfg. Co., 350 State St., Binghamton, N. Y., since 1944, has withdrawn from the firm to establish the KUPFRIAN MFG. CO., with offices at the same address. Two manufacturing plants have been set up in Binghamton and Deposit, N. Y. The new organization is successor to the Special Products Division of the parent firm, which manufactured, primarily, flexible-shaft couplings or remote controls and wire shielding for the electronics and instrumentation fields. Other products of the company will include Monocoil (Bowden) casing and push-pull controls for the marine, automotive, and industrial fields. The Elliott Mfg. Co. will continue to manufacture flexible shafting and accessories for the portable power-tool trade and flexible shafting for equipment manufacturers.



Gene Demambro, new president of Lincoln Park Industries

GENE DEMAMBRO was recently elected president of Lincoln Park Industries, Inc., Jamestown, N. Y. Mr. Demambro was previously vice-president of the corporation and general manager of the Curtis Machine Division.

GENERAL ELECTRIC CO., Schenectady, N. Y., has announced the following changes in the company's Large Apparatus Division: C. W. FULLER has been transferred to the staff of the manager of manufacturing; N. E. FIRESTONE has been appointed staff assistant to the manager of manufacturing; K. O. SCHULTE has been made manager of wage rate, and W. H. BOBEAR manager of purchasing; T. F. GARAHAN has been appointed production manager, and K. N. BUSH assistant production manager; and A. V. FEIGENBAUM has been named supervisor of training, manufacturing personnel.

GRESWOLD VAN DYKE has been appointed executive director for stainless steel producers of the American Iron and Steel Institute, an organization for the development of uses of stainless steel. A permanent stainless steel industry exhibit and information center are maintained in the Architects Bldg., 101 Park Ave., New York City, under the direction of RICHARD A. PARET. Mr. Van Dyke will make his headquarters at the American Iron and Steel Institute, 350 Fifth Ave., New York City.

TITANIUM METALS CORPORATION OF AMERICA is a new organization formed by the NATIONAL LEAD CO. and the ALLEGHENY LUDLUM STEEL CORPORATION of Pittsburgh, Pa., to market and distribute titanium metal and its alloys, as well as various related products. The company will make its headquarters in New York City. The officers are as follows: President, H. C. WILDNER; vice-president, CLARK W. KING; and secretary-treasurer, A. H. DREWES.

GENERAL ELECTRIC CO., Schenectady, N. Y., announces the following appointments in its apparatus department: P. L. ALGER, MARSHALL ANDERSON, T. M. LINVILLE, C. H. RIDGLEY, and F. P. WILSON, JR., have been named staff assistants. T. D. FOY has been appointed administrative assistant of the Small Apparatus Divisions; F. T. LEWIS, manager of manufacturing; and B. A. CASE, manager of engineering.

E. W. BLISS CO. (Export Division), 19 E. 47th St., New York City, has been appointed exclusive foreign agent for the sheet-metal fabricator built by the Wales-Strippit Corporation, North Tonawanda, N. Y. The E. W. Bliss Co. will introduce this machine to European trade at the International Fair to be held in Milan, Italy, April 12 to 29.

C. SWAN WEBER has been appointed manager of the eastern district of the Westinghouse Electric Corporation, Pittsburgh, Pa., with headquarters in New York City. Mr. Weber, formerly manager of the Newark office, fills the position previously held by H. H. ROGGE, vice-president.

Ohio

D. M. BERGES has been appointed chief engineer of the Pesco Products Division, Borg-Warner Corporation, Cleveland, Ohio, manufacturer of pumps, hydraulic power units, and valves. Mr. Berges' appointment fills a vacancy in the engineering department that has existed since J. A. LAUCK was elected vice-president in charge of engineering several months ago. Prior to this, Mr. Berges had been chief engineer of the Pesco electrical section since 1943.

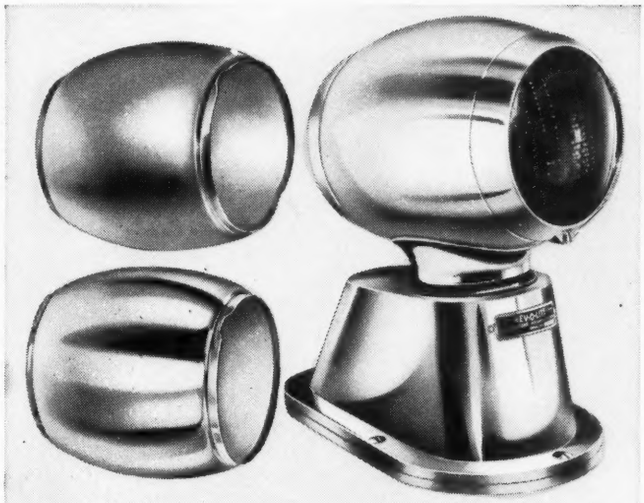
WALTER F. KNEBUSCH has been appointed director of manufacturing for the Harris-Seybold Co., Cleveland, Ohio. Mr. Knebusch has held the position of works manager of the company's Harris Division plant in Cleveland since 1943. The company manufactures lithographic and typographic printing presses, power paper cutters, and related equipment for the graphic arts industry.

WILLIAM A. MUNKACSY was recently elected president of Munray Products, Inc., sales division of the Poly-Cyclo Products Co., Cleveland, Ohio, manufacturer of corrosion-resistant materials and equipment, coatings and finishes, moldings and extruded products, etc. Mr. Munkacsy is also president of the Poly-Cyclo Products Co.

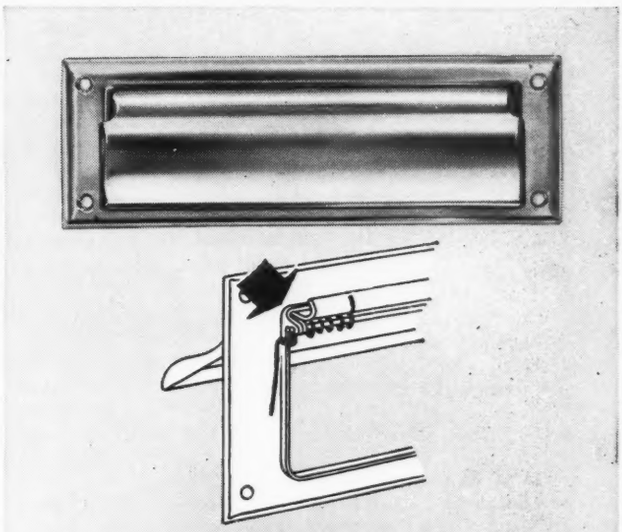
2 MORE EXAMPLES

how manufacturers improved their products . . . cut production costs with the aid of

REVERE PRODUCTS and SERVICE



UPPER LEFT shows brass shell of the Rev-O-Lite as it comes from the bulging die. Without any extra finishing, which would have been necessary had shell been made of strip and brazed, shell is chrome plated as shown at lower left. At right is the completed assembly of the Rev-O-Lite ready for action on the roofs of all kinds of emergency vehicles such as police patrol cars, ambulances, fire trucks, etc. Chrome finish base is of cast zinc alloy.



THE LETTER BOX PLATE that is not only one of the first to be made from wrought brass but, the Ives Company tells us, has been generally accepted by the trade as the equal of similar items in cast brass. Another example of what can be accomplished when manufacturer and supplier work together.

Line drawing directly above shows detail of construction with Ives exclusive, Weather-Tite interlocking feature.

1. In the development of their Rev-O-Lite, a revolving warning light for emergency vehicles, the Balford Corporation, Jacksonville, Florida, found themselves faced with a production problem regarding the cylindrical shell which contains the lights. The question was; what would be the most efficient and economical way to produce this shell that measures 6″ in length and is 4½″ in diameter at the ends? Should it be formed from a metal strip and brazed? Could tube be used and bulged in a die? Or, should some other method be employed.

Revere, working with the design engineers of the Balford Corporation, exchanged ideas, weighed the pros and cons of various methods; experimented. They found that by using 70/30 Revere Brass Tube in a light anneal temper, it would take the bulging in the die satisfactorily and at the same time show up well as far as grain size control was concerned. By this method, complicated and costly forming operations and brazing could be eliminated; production speeded and the shell formed without any unsightly seam. Also, no extra hand finishing would be necessary before plating.

2. How can you make a letter box plate out of wrought brass and at the same time have it look like cast brass? This problem of the H. B. Ives Company, New Haven, Conn., came up while the Ives engineers were designing a new type plate employing a new method of interlocking the flap and the frame of the box to insure its being weather-tight.

Casting was ruled out as too costly and impractical to construct. If brass strip was used it had to be heavy enough to simulate cast hardware, yet sufficiently flexible to complete a U bend on a 7″ length without fracture or distortion. Also, because the finished plate would in most cases call for a natural brass finish, the stock had to be the right color.

After several consultations with Revere Technical Advisory Service and experiments in their own shop, it was suggested that Revere sheet brass of .062″ thickness and of a certain temper be used. That was it! The combination of proper design and heavy gauge metal resulted in a neat but rugged appearance. The wrought construction made it possible to produce a Weather-Tite plate with exclusive interlocking feature without costly machining operations. In addition, finishing costs were reduced to a minimum.

Perhaps one of the many types of Revere Brass or one of the other Revere Metals or Alloys can help you improve *your* product—cut your production costs. Why not tell Revere's Technical Advisory Service about *your* metal problems? Call the Revere Sales Office nearest you today.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.
Sales Offices in Principal Cities, Distributors Everywhere.



Hans Ernst, director of research, Cincinnati Milling and Grinding Machines, Inc., who has been selected as Cincinnati's outstanding engineer of the year

HANS ERNST, director of research of Cincinnati Milling and Grinding Machines, Inc., Cincinnati, Ohio, was recently honored by being selected Cincinnati's outstanding engineer of the year. In an engineering city such as Cincinnati, this recognition is impressive. A citation in the form of a scroll was presented to Mr. Ernst at the annual joint Technical and Scientific Societies' meeting held at the Taft Auditorium in Cincinnati on February 3. His name will also be inscribed on a bronze plaque, to be placed in the Engineering Society's headquarters. Mr. Ernst is the author of many booklets and papers in the field of mechanical engineering, particularly on the subject of metal cutting.

ALFRED O. WEILAND has been named general manager of the Lima Works, Lima-Hamilton Corporation, Lima, Ohio. During World War II, Mr. Weiland was vice-president and general manager of the General Machinery Ordnance Corporation, Charleston, W. Va.

LEON F. MILLER has been elected vice-president in charge of sales and engineering for the Foundry Machine Division of the Osborn Mfg. Co., Cleveland, Ohio. Mr. Miller joined the company in 1929, and for the last six years has been sales manager.

JOHN F. BLACK has resigned as president of the Circo Products Co., Cleveland, Ohio, manufacturer of vapor degreasing equipment, and JOSEPH W. POWELL, JR., has been elected to succeed him.

Pennsylvania and Maryland

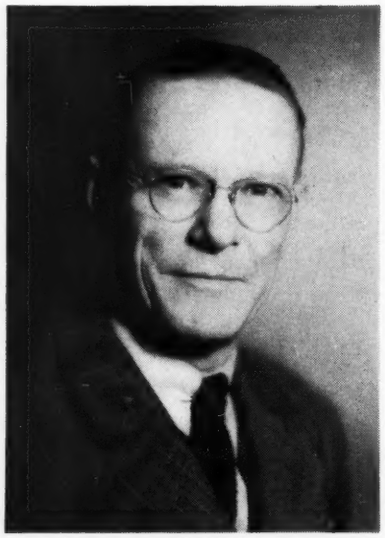
DAVID KIRK STUART has been appointed manager of the Pittsburgh branch of the Crucible Steel Co. of America, and RICHARD J. RAND has been made assistant branch manager. Mr. Stuart succeeds JOHN S. BILLINGSLEY, who has been promoted to the position of central sales manager. Mr. Rand was formerly office manager of the Pittsburgh branch of the company.

GEORGE K. GARRETT CO., manufacturer of "Diamond G" products, announces the construction of a new plant in Elwood City, Pa., to expand its production facilities. The building, which is of one-story construction, covers more than 50,000 square feet of manufacturing space. Flat washers of all types and completed assemblies will be produced at the new plant.

HARRY M. REED has been elected a director of the Vanadium-Alloys Steel Co., Latrobe, Pa., replacing the late Alexander Nimick, Sr. Mr. Reed is secretary of the company, and has been associated with the organization since 1925.

E. V. PRENTICE CO., 2303 N. Randolph Ave., Portland 12, Ore., has been appointed Pacific Northwest sales representative of the R. D. Wood Co., Philadelphia, Pa., manufacturer of hydraulic presses.

C. J. MARLETT, representative for Kennametal, Inc., in the Chicago district during the last seven years, has been transferred to the engineering department at Latrobe, Pa. As project engineer, he will be engaged in research and developments on new applications of Kennametal.



C. J. Marlett, newly appointed project engineer for Kennametal, Inc.

A. C. THOMPSON, formerly works manager of the Bartlett Hayward plant of Koppers Co., Inc., Pittsburgh, Pa., has been promoted to the position of production manager for the company's Metal Products Division at Baltimore, Md. The company has also announced the appointment of NICK KAY as general superintendent of the Metal Products Division's machine shops, and E. A. FRANKE as general superintendent of the Division's foundries.

Coming Events

MARCH 14-16—National passenger car, body, and production meeting of the SOCIETY OF AUTOMOTIVE ENGINEERS at the Book-Cadillac Hotel, Detroit, Mich. Secretary and general manager, John A. C. Warner, 29 W. 39th St., New York 18, N. Y.

MARCH 28-31—FOURTH NATIONAL PLASTICS EXPOSITION at the Navy Pier, Chicago, Ill. Sponsored by the SOCIETY OF THE PLASTICS INDUSTRY. William T. Cruse, executive vice-president, 295 Madison Ave., New York 17, N. Y.

APR'L 5-7—Twelfth annual MIDWEST POWER CONFERENCE at the Sherman Hotel, Chicago, Ill. Sponsored by the Illinois Institute of Technology, 3300 S. Federal St., Chicago 16, Ill.

APRIL 10-12—Fifth annual convention of the AMERICAN SOCIETY OF LUBRICATION ENGINEERS at the Hotel Statler, Detroit, Mich., in conjunction with the third annual LUBRICATION EXHIBIT of the Society. W. F. Leonard, secretary-treasurer, Chicago 4, Ill.

APRIL 10-14—Exposition of the AMERICAN SOCIETY OF TOOL ENGINEERS at the Convention Hall and Commercial Museum in Philadelphia, Pa. Details available upon request to the Exposition headquarters of American Society of Tool Engineers, 10700 Puritan Ave., Detroit 21, Mich.

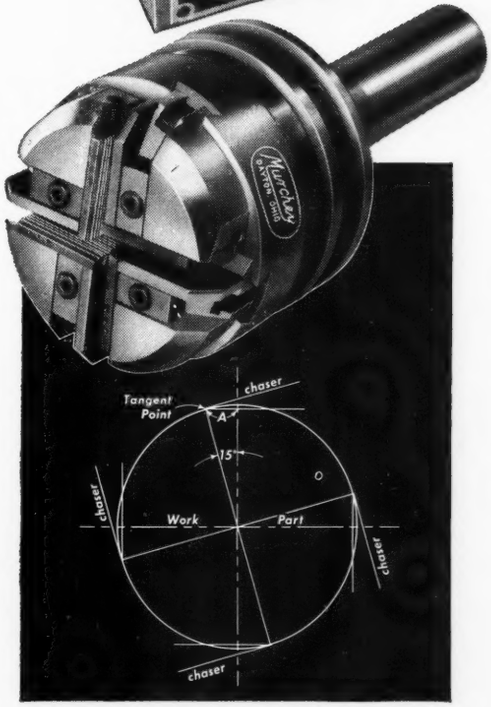
JUNE 26-30—Annual meeting of the AMERICAN SOCIETY FOR TESTING MATERIALS AND NINTH EXHIBIT OF TESTING APPARATUS at the Chalfonte-Haddon Hall, Atlantic City, N. J. Executive secretary, C. L. Warwick, 1916 Race St., Philadelphia 3, Pa.

OCTOBER 23-27—NATIONAL METAL CONGRESS and EXPOSITION at the International Amphitheatre, Chicago, Ill. For further information, address W. H. Eisenman, managing director, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

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Obituaries



Major Albert B. Cudebec

Major Albert B. Cudebec, vice-president of Hydropress, Inc., of New York City, died suddenly of a heart attack on January 28 in Philadelphia, at the age of seventy-two. Major Cudebec was born in Nunda, N. Y., in 1878, and was a graduate of Cornell University. During World War I he became a member of the staff of General Pershing and an officer of the French Legion of Honor. He was also a holder of many war decorations and citations from the United States and several foreign governments.

After the war he was appointed technical and industrial advisor to leading American and French banks. In 1937, he joined the Loewy Engineering Co., Ltd., of England, for whom he acted as representative and trustee in the United States. In 1940, he became vice-president of Hydropress, Inc., and helped substantially to build up the activities of that corporation. He was also very active in the development of ordnance equipment during World War II.

Major Cudebec, a man of great personal charm and outstanding professional qualities, had a wide circle of friends. For many years, he had been Commander of the American Legion Post in Paris, France, and was also a member of the Army-Navy Club, the Army Engineers Club, the American Society of Mechanical Engineers, the Association of Iron and Steel Engineers, the American Ordnance Association, and the National Association of Manufacturers. His hobby was fishing and hunting, of which sports he was an ardent enthusiast.

William B. Knight

William Benjamin Knight, president and founder of the W. B. Knight Machinery Co., St. Louis, Mo., died on January 7 at the age of eighty-four years. Mr. Knight was born in Canada and went to St. Louis in about 1882. He founded the machine tool manufacturing company bearing his name in 1891. The company was incorporated in 1905 and started the manufacture of milling machines the following year. Mr. Knight is survived by his widow, two daughters, and four sons.

G. Earl Jones died of a heart attack on February 12 in the Holland Hospital, Holland, Mich., at the age of sixty-eight. Mr. Jones represented the Lovejoy Tool Co., Inc., Springfield, Vt., in Michigan for twenty-two years.

New Books and Publications

Patent Tactics and Law (Third Edition). By Roger Sherman Hoar. 352 pages, 6 by 9 inches. Published by the Ronald Press Co., 15 E. 26th St., New York 10, N. Y. Price, $7.

Revolutionary changes have taken place in patent law during the ten years that have elapsed since the publication of the second edition of this book. The rules of practice of the Patent Office were completely revised, rewritten, and renumbered, effective March 1, 1949. The present edition contains the new rules and the latest information on the subject. A considerable number of case citations have been added to cover important cases of recent years. The purpose of the book is to give sufficient information on patent law and procedure to enable a business executive, engineer, or inventor to cooperate with his patent attorney in dealing with a specific patent problem.

An idea of the treatment will be obtained from the following list of chapter headings: What is a Patent?; The Business Aspect of Patents; What is Patentable?; Anticipation and Domination; Who is Entitled to a Patent?; Preliminary Protection; Drafting the Application; Fighting it out; Miscellaneous Considerations of Prosecution; Interferences; Appeals and the Like; Protecting a Patent; Conflicting Rights; Infringements; Searches; Foreign Patents; The Choice of an Attorney; Organizing a Patent Department; Interpretation and Validity; Legal Papers; and Forms for Patent Contracts.

Lasser's Business Tax Handbook. By J. K. Lasser. 792 pages, 5 by 8 1/4 inches. Published by Simon & Schuster, Inc., 1230 Sixth Ave., New York 20, N. Y. Price, $5.

The third edition of this tax handbook contains more than 10,000 practical ideas for running a business "tax-wise," and constitutes a guide to business operation and taxes. This is not a textbook on business taxation; it includes only that material which the author believed necessary to set down the known alternatives for business tax reduction. Chapter headings are as follows: How to Operate a Business Tax-Wisely for the Benefit of the Family; What Business Form to Use and How to Change, Merge, or Liquidate; How to Operate a Proprietorship or Partnership; How to Conduct a Corporation to Avoid Tax Difficulties; How to Do Business Abroad; How to Deal with Your Stockholders and Bondholders; How to Sell or Buy Business Property; How to Deal with Securities; How to Buy, Sell, and Operate Real Estate; How to Pay Compensation to Employes; Tax Accounting Methods and Elections to Reduce Your Tax; and Planning Business Expenses. In addition to an unusually complete index, there is a check list for self-analysis of the user's business, with page reference numbers for solutions to many questions that arise concerning tax matters.

Grinding Practice (Third Edition). By Fred H. Colvin and Frank A. Stanley. 419 pages, 6 by 9 inches. Published by the McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. Price, $3.75.

Various types of grinding machines, how they are operated, and their application on different types of work are described in this book. The present edition includes the new standard capacity for cylindrical grinding machines, the new safety code for grinding wheels, and the new method of marking grinding wheels which has been adopted by all makers of abrasive wheels. Information is given on such subjects as the use of diamond abrasive wheels; wheels for cutting-off work; and the use of small mounted wheels and abrasive points. Precision grinding to millionths of an inch; the grading of diamond powder for lapping; and honing and surface finishing, including super-finishing, are also discussed.